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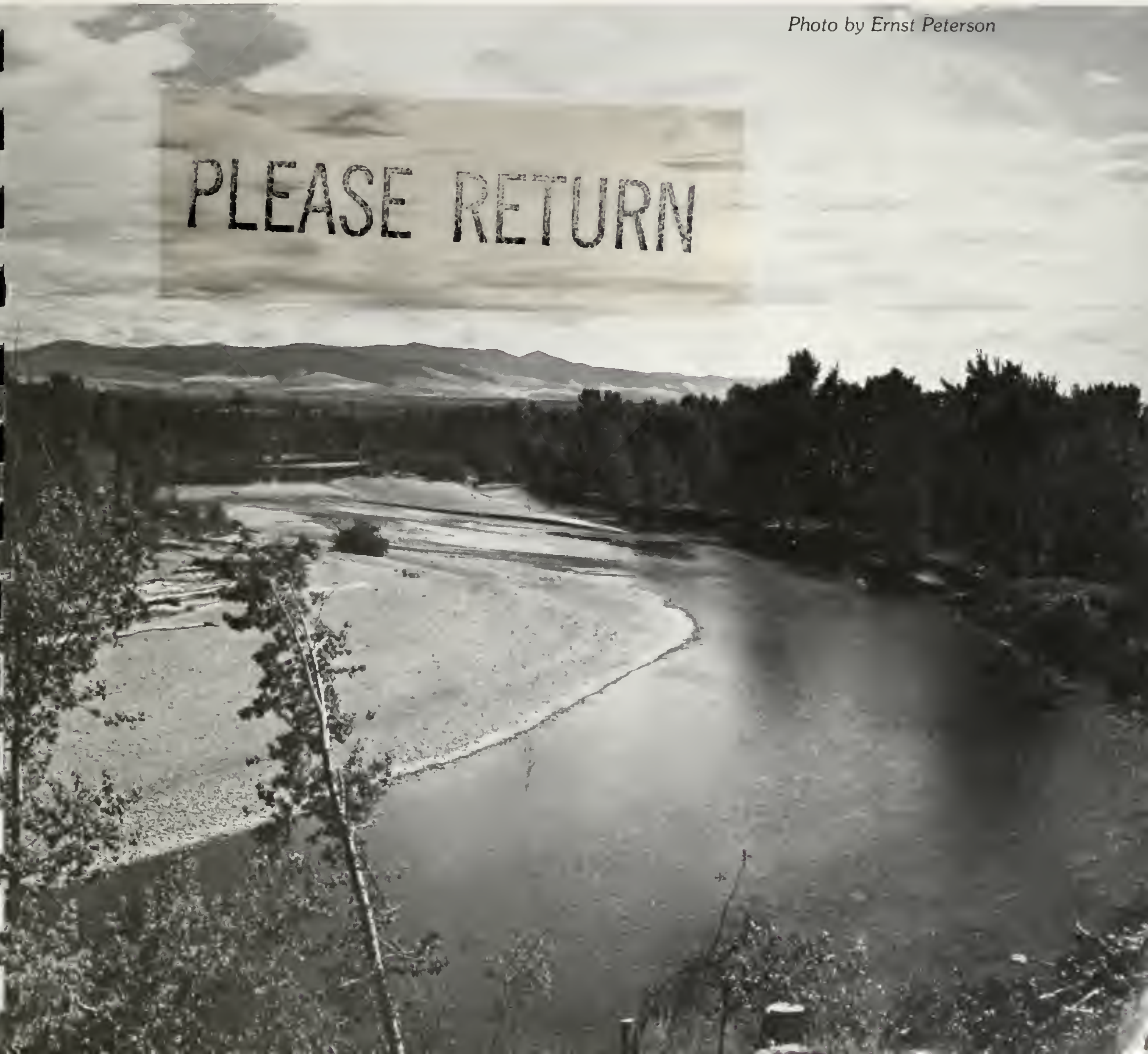

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BITTERROOT CONSERVATION DISTRICT

LONG RANGE PROGRAM
FOR
SOIL AND WATER CONSERVATION

MONTANA

1980

FORWARD

The Bitterroot Conservation District, first organized in 1941, was chartered by the Secretary of State in June, 1943. It operates presently under policy specified in Section 76-15-102 of the Montana Codes Annotated, 1979. The boundaries of the Bitterroot Conservation District are identical with those of Ravalli County. Its Board of Supervisors consists of citizens of the District, five of whom are elected by registered voters of the District, and two of whom are appointed by Mayors of incorporated cities lying within the Conservation District. The District, as a legal subdivision of the State under the Department of Natural Resources and Conservation, Conservation Districts Division, has been given responsibility for the wise use, development and conservation of soil and water within the District.

This Long Range Plan represents the fundamental policy framework within which the Bitterroot Conservation District will attempt to discharge its perceived responsibilities as described in the preceding paragraph. It is a framework within which assistance will be afforded to individuals and organizations, both private and public, in their efforts at resource use and conservation. It is a pattern which includes broad oversight of both non-agricultural and agricultural uses of land and water. It is intended also as a mechanism for furnishing assistance to communities, entire watersheds and governmental agencies in planning and executing programs of water and soil development or programs which only incidentally impinge upon existing water and soil resources.

This document is conceived as an ever-changing one. As circumstances and our perceptions of circumstances change, so will this Long Range Plan. Thus, revision of this plan at timely intervals may be expected.

Acknowledgements The Board of Supervisors acknowledges with gratitude the help and cooperation it has received from many organizations and individuals in its preparation of the 1980 Long Range Plan. More specifically, we thank Thelma Taylor and Genevieve Tinkey, our Administrative Assistant, for their efforts in finding and gathering the data presented, and in organizing this document. We owe a special debt of gratitude to Robert Morgan, Supervisor of the Bitterroot Forest, for his timely interest and valuable assistance during the months that this document was being developed.

"The measure of effectiveness of any Long Range Plan dealing with Natural Resource Management is its usefulness. If current reference to the plan is not essential to program success, it has served merely as a refresher for the author." - Bob Morgan

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A. Introduction

1.1 Authorization

1.11 State Law

Title 76, Chapter 15 of the Montana Codes Annotated, 1979, provides for the creation of Conservation Districts in the state. This state legislation has given each Conservation District the responsibility for conservation of soil resources; and the conservation, development, utilization and disposal of water through appropriate soil-conserving land use practices. (Refer to Appendix B. for related state legislation.)

1.12 Brief Description of the Bitterroot Conservation District Organization

a. Supervisors

A seven (7) member Board of Supervisors is the governing body of the Conservation District and consists of five (5) supervisors elected at a general election from within the District, and two (2) supervisors appointed from among residents of the incorporated municipalities of Hamilton, Darby and Stevensville. The elected supervisors each serve a four (4) year term and the two appointed supervisors rotate annually from among the cities and each serve for two (2) years. A chairman is elected annually from its members.

b. Powers

The Bitterroot Conservation District is a governmental subdivision of the state and a public body, corporate and politic, exercising public powers.

The Bitterroot Conservation District was first organized in November, 1941. The name of the Conservation District has undergone changes from "Bitterroot Soil and Water Conservation District" to its present name of "Bitterroot Conservation District."

1.13 Bitterroot Conservation District Policy

Conservation District policy is laid down in Section 76-15-102 of the Montana Codes Annotated, 1979: It is hereby declared to be the policy of the legislature to provide for the conservation of soil and soil resources of this state, for the control and prevention of soil erosion, for the prevention of flood water and sediment damages, and for furthering the conservation, development, utilization, and disposal of water and thereby to preserve natural resources, control floods, prevent impairment of dams and reservoirs, preserve wildlife, protect the tax base, protect public lands, and protect and promote the health, safety, and general welfare of the people of this state.

Further, it is the Bitterroot Conservation District's policy to work cooperatively with individuals, groups, local governments and the federal government to better achieve mutual objectives related to sound soil and water conservation planning.

1.14 Brief Description of Area

The Bitterroot Conservation District is coterminous with Ravalli County and consists of 1,526,760 acres. The District includes the three incorporated municipalities of Hamilton, Stevensville and Darby, as well as the rural communities of Charlos Heights, Conner, Corvallis, Grantsdale, Florence, Pinesdale, Sula, Victor and Woodside.

TABLE 1.

TOTAL POPULATION
Bureau of the Census

	1960	1970	1980*	%Increase 1960-1970	%Increase 1970-1980	%Increase 1960-1980
Hamilton	2,475	2,499	2,657	1%	6%	7%
Stevensville	784	829	1,187	6%	43%	51%
Darby	398	538	577	35%	7%	45%
Ravalli Co.	12,341	14,409	22,427	17%	56%	82%

* Preliminary data

The District encompasses the upper and major portion of the Bitterroot Valley, including parts of the Sapphire Mountains to the east, the Bitterroot Mountains to the west, and the Bitterroot River which flows south to north, and eventually into the Clark Fork of the Columbia River. The main stem of the Bitterroot River begins where the East and West Forks join, south of Conner.

1.15 Relationship to Other Organizations

Other related laws are found in Appendices A. and B. A listing of memoranda of understanding and agreements with the Conservation District are found in Appendix C.

a. U.S. Department of Agriculture (USDA)

1. Soil Conservation Service (SCS)

The SCS was created in 1935 to plan and carry out a national program to protect and develop our soil, water and related natural resources. SCS gives technical and financial assistance to individuals, groups, and state and local units of government, including the Bitterroot Conservation District. SCS is organized on a local level and has a wide range of staff members who are scientists, engineers, conservationists, foresters and related specialists. SCS is a technical assistance resource to the Conservation District.

2. Agricultural Stabilization and Conservation Service (ASCS)

ASCS provides the local administration of a large variety of financial assistance programs related to water and land resources.

3. Forest Service

The Forest Service objectives and responsibilities concerning soil and water conservation on public land generally parallel those of the Conservation District on private lands. It is therefore Forest Service policy to cooperate with and aid the Conservation District. In the case of the Bitterroot Conservation District and the Bitterroot National Forest, there are many mutual problems, opportunities and benefits; the Forest Service gains at least as much from this cooperation as the Conservation District.

4. Farmers Home Administration (FmHA)

FmHA works indirectly with the Conservation District through the Soil Conservation Service. Many of FmHA's programs relate to and complement the efforts of the Conservation District.

b. Environmental Protection Agency (EPA)

EPA is the federal agency responsible for, among other things, overseeing efforts at improving this nation's water quality. The EPA has established rules and regulations for carrying out its mandate and assists the Conservation District in a cooperative effort to improve and maintain the quality of our local streams and rivers.

c. Montana Department of Natural Resources and Conservation (DNRC)

DNRC is responsible through the Division of Conservation Districts for providing appropriate supervision and assistance to the Conservation District supervisors in carrying out their powers and duties, and coordinating the common efforts of the Conservation Districts. Assistance is provided in areas such as forest management, natural resource and conservation planning, and in energy conservation programs.

The Hamilton Unit of the Montana Division of Forestry oversees timber management for Conservation District cooperator farm projects. Assistance is also provided to landowners in several phases of forest management, including cost-sharing, insect and disease control and reduction of fire hazards.

d. Montana Department of Health and Environmental Sciences (DHES)

The primary purpose of DHES is to protect the health of the citizens of the state, and to perform functions in the areas of air and water quality control and environmental sanitation. The Environmental Sciences Division consists of the Air Quality Bureau, the Solid Waste Management Bureau, the Subdivision Bureau, and the Water Quality Bureau. Their major goal is to protect public health through maintenance of the environment so that present and future generations may enjoy the full benefit of natural and man-made resources. DHES works with the Conservation District in providing administrative and regulatory guidelines to effect their common goals.

e. Montana Department of Fish, Wildlife and Parks (DFWP)

The DFWP, formerly the Dept. of Fish and Game, shares a common goal with the Conservation District, the conservation of natural resources. Projects affecting fish and wildlife habitat are jointly reviewed by DFWP and the Conservation District. The DFWP assists the Conservation District in the management of agricultural, fish and wildlife production, and maintains official ties with the Conservation District.

f. Ravalli County Cooperative Extension Service

The Extention Service is an agency jointly sponsored by Montana State University, USDA and Ravalli County. The Extension Service provides assistance to individuals in the areas of farm operation and management. The Extension Service works with SCS, the Conservation District and other agencies with related missions to provide a number of educational programs regarding the wise use of soil and water resources. There is a great deal of interaction with the Conservation District.

The Western Research Center, which is located on Quast Lane in Corvallis, is one of Montana State University's Agricultural Experiment Stations serving western Montana in the areas of horticulture, small farm technology, soils and biological weed control.

g. Bitter Root Resource Conservation and Development Project (RC&D)

The Bitter Root RC&D was formed in 1966 and is sponsored by the USDA, the Conservation Districts and the counties of Ravalli, Missoula and Mineral. The RC&D assists individuals, groups, and local governments with proposed projects dealing with natural resources, economic development, and culture. The overall program is formulated to fulfill local needs and encourage local leadership. Selected aspects of the resource planning and development activities of the Conservation District afford support to the RC&D.

h. Ravalli County

The government of Ravalli County supports the Bitterroot Conservation District by providing support and sponsorship for the District's programs and activities. The County has, as a result of the Conservation District, a readily available source of technical and conservation related assistance.

i. Ravalli County Fish and Wildlife Association

The Ravalli County Fish and Wildlife Association is devoted to the protection and improvement of fish and wildlife habitat in the county, and in assisting with the propagation of fish and wildlife. The Association also assists with recommending regulatory measures for the harvest of fish and game, natural resources, control floods, prevent impairment of dams and reservoirs, preserve wildlife, protect the tax base, protect public lands, and protect and promote the health, safety, and general welfare of the people of this state.

Further, it is the Bitterroot Conservation District's policy to work cooperatively with individuals, groups, local governments and the federal government to better achieve mutual objectives related to sound soil and water conservation planning.

1.2 Brief Description of the Bitterroot Conservation District Long-Range Plan

1.21 Scope

The long-range plan encompasses the conservation and development of land, water and related resources, for both agricultural and non-agricultural uses.

1.22 Purpose

The long-range program serves as the basis for each year's annual plan of operations and also acts as the background upon which assistance is made available to the Conservation District by the various departments and agencies of local, state and federal government.

1.3 Major Natural Resources

1.31 Water Resources

a. The Bitterroot River and Tributaries

The Bitterroot River basin contains fourteen watersheds with a total of forty-eight tributaries or subbasins. (Refer to Appendix D-1 for map, "Drainages, Flood Zones.") The Bitterroot River is a braided stream with a gradient ranging from 0.34 to 0.008 percent. The river system is dynamic, moving every Spring during high and heavy water flows. The total channel length from the confluence of the East and West Forks to the Clark Fork River was 4,446,383 feet, or 84.5 miles, in 1979. The following are mean values for sinuosity and per unit braided for the years shown:

	1936-1940	1972[1]
Sinuosity (km/km)	1.23	1.17
Per unit braided	45	52

Overall, the Bitterroot River between Darby and Missoula underwent a 4.7 kilometer (2.9 mile) reduction in length between 1936 and 1972. This accounts for a 4% overall shortening and a 4% increase in slope. The channel adjustments did not occur evenly over the river's length, but were concentrated in a few overlapping reaches.

---

[1] Erosion and Stream Channel Stability in the Bitterroot River Watershed, Southwestern Montana, Ken D. Cartier, Robert R. Curry, Dept. of Geology, Univ. of Montana, Missoula, Montana, January 1980.

In the past forty years, the Bitterroot River has undergone a major increase in slope and sediment discharge. As the stream shortens and the downslope increases, one of the results is that a greater volume of stream water is able to leave the watershed at a faster rate.[1]

The following table displays the water yield for the Bitterroot River and its tributaries.

TABLE 2.

WATER YIELD FOR THE BITTER ROOT RIVER AND TRIBUTARIES
Based on 1953-67 Period

Name	Approx Drainage Area Sq. Mi.	Average Annual Precip. Inches	Average Annual Yield 1000s Acre Feet
Upper West Fork	111	33	68.0
Hughes Creek	62	33	38.0
Overwhich Creek	95	31	50.6
Blue Joint Creek	73	34	46.6
Piquett Creek	49	28	22.0
Nez Perce Fork	99	43	92.3
Boulder Creek	32	67	51.2
Trapper Creek	37	62	54.2
Chaffin Creek	27	47	27.4
Tin Cup Creek	57	56	75.9
Rock Creek	68	68	109.0
Upper East Fork	56	38	43.3
Moose Creek	61	35	40.5
Meadow Creek	38	32	22.3
Cameron Creek	78	22	22.8
Tolan Creek	43	28	19.5
Camp Creek	36	27	15.3
Warm Springs Creek	93	28	42.0
Rye Creek	68	23	21.7
Burke-Harlan	39	18	5.2
Sleeping Child Creek	93	27	42.1

---

[1] Erosion and Stream Channel Stability in the Bitterroot River Watershed, Southwestern Montana, Ken D. Cartier, Robert R. Curry, Dept. of Geology, Univ. of Montana, Missoula, Montana, January 1980.

TABLE 2. (cont'd.)

Name	Approx. Drainage Area Sq. Mi.	Average Annual Precip. Inches	Average Annual Yield 1000s Acre Feet
Skalkaho Creek	121	32	71.0
Gird Creek	48	19	9.0
Lost Horse Creek	75	68	126.0
Roaring Lion Creek	54	54	67.6
Sawtooth Creek	44	59	61.9
Blodgett Creek	36	62	54.1
Mill Creek	46	61	66.9
Fred Burr Creek	26	56	34.0
Bear Creek	42	54	53.1
Sweathouse Creek	32	46	31.7
Big Creek	64	55	82.6
Willow Creek	63	21	15.1
Willoughby-Spooner	95	15	5.1
Burnt Fork Creek	101	27	43.6
Kootenai Creek	42	59	58.9
Ambrose-Three Mile	86	17	10.0
Bass Creek	24	58	33.3
Sweeney Creek	47	58	65.0
Eight Mile	36	19	6.7
Carlton Creek	15	45	14.4
Davis-Woodchuck	37	18	5.5
Miller Creek	59	18	7.8
Upper Lolo Creek	74	48	71.0
Middle Lolo Creek	86	34	45.7
South Fork Lolo Creek	54	56	63.4
Lower Lolo Creek	95	32	45.6
O'Brien Creek	27	33	13.7
TOTAL	2,844		2,072.6

Source: "Hydrology of Bitterroot River Drainage", USDA - SCS, Bozeman, Montana, November, 1972.

The U.S. Geological Survey has a streamflow gauging station on the Bitterroot River, established in April of 1937 near Darby. The maximum discharge at this station was 11,500 cubic feet per second (cfs) on May 9, 1947; the minimum discharge was 71 cfs on February 9, 1939; and the average discharge for 1937-1977 was 931 cfs. Over 60% of the Bitterroot River's outflow occurs during May and June.

The Bitterroot River has many attributes which make it an attractive, aesthetic and economic resource.

b. Precipitation

The thirty-year annual average precipitation varies from twelve inches in the valley floor to 100 inches at the peaks of the Bitterroot Mountains. (Refer to Appendix D-2, "Average Annual Precipitation.") The lower Sapphire Mountains on the east side of the Bitterroot Valley receive an average of approximately fifty inches per year. The maximum precipitation in the mountains usually occurs during December and January, and in the lower portions of the valley during May and June. The minimum precipitation in the mountains and in the valley usually occurs during July and August.

TABLE 3.
Hamilton Area
Precipitation (in inches)
1931 - 1971

Months	Mean Monthly Precipitation	Record Maximum Precipitation	Record Minimum Precipitation
January	1.05	3.13	0.06
February	0.80	2.42	trace
March	0.64	1.70	0.05
April	0.81	2.35	0.06
May	1.45	4.42	0.19
June	1.87	4.32	0.39
July	0.77	2.04	0.01
August	0.68	2.01	trace
September	1.06	2.67	0.01
October	1.01	2.84	0.08
November	1.05	3.18	trace
December	1.02	5.56	trace
Annual Average	12.21		

Source: Soil Conservation Service, Hamilton Unit, Montana.

c. Mountain Snow Pack

Approximately two-thirds of the precipitation occurring in the mountains is contained in snow pack, the primary source of the valley's water. A snow survey program is conducted by the SCS and private cooperators. Most of the snow courses are measured during the first week of the months of January through May. Data gathered are used to forecast streamflow for recreation, agriculture, reservoir information and to supplement climatic data. (Refer to Appendices D-3, "Average Annual Snowfall"; and D-4, "Snow Maximum Loads.")

d. Ground Water Supply[1]

Ground water is not just water under the ground; it also is water held in the rocks by certain forces, replenished by nature according to the climate and geology. Consequently, ground water varies in both amount and quality. Hydrologists use the word "rock" to mean both hard, consolidated formations such as sandstone, limestone, granite or lava rocks, and loose, unconsolidated sediments such as gravel, sand and clay. The word "aquifer" is used for a layer of rock that carries an available supply of water. Gravel, sand, sandstone and limestone are the best water carriers. Clay, shale and crystalline rocks are poor water producers, but may yield enough water for individual domestic and stock uses where no better aquifers are present.

The Bitterroot Valley is underlain with great thicknesses of unconsolidated coarse to fine sediments containing spaces between individual grains. The average porosity of the sediments, or the spaces that can hold water, is about 40% for every 100 cubic yards of sediment. In other words, for every 100 cubic yards of sediment there is a capacity for approximately 40 cubic yards of water.

Well capacity is expressed as the number of gallons per minute (gpm) of water yield per foot of drawdown. Capacities of wells on the east side of the Bitterroot Valley range from 8 to 230 gpm, while wells on the west side range from 7 to 55 gpm. The ground water flow ranges from 400 feet per year, to more than 1000 feet per year.[2]

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[1] A Compilation and Synthesis of Existing Water Resource Information on the Bitterroot Drainage, Montana, Bitter Root Water, Inc., Hamilton, Montana, April, 1975, p. 30.

[2] A Compilation and Synthesis of Existing Water Resource Information on the Bitterroot Drainage, Montana, Bitter Root Water Inc., Hamilton, Montana, April 1975.

The supply and quality of surface water is so variable that people have tended to use ground water as a more reliable source. The ground water that seeps into streams provides the base flow of the streams, the low flow that is sustained through the driest part of the year. Yearly recharge of ground water is approximately equal to yearly discharge. Recharge to the ground water is primarily by streams and irrigation and, to a lesser degree, by precipitation and snow melt. The U.S. Geological Survey findings show that the water from high spring runoff is rejected, and not absorbed.

e. Reservoirs

There are two major reservoirs within the Bitterroot Conservation District. Painted Rocks Lake has a storage capacity of 33,000 acre feet, and a surface area of about 655 acres. Lake Como has a storage capacity of 34,800 acre feet, and a surface area of about 725 acres.[1] Of these two major reservoirs, Lake Como was originally a lake of less capacity, but was later increased by the introduction of a dam. Painted Rocks Lake is entirely manmade.

According to the Forest Service Dam Inventory of 1972, there are 26 small dams located on the high lakes in the Bitterroot and Sapphire Mountains, with a total of approximately 14,500 acre feet of storage. A total of 27 other dams which were maintained for irrigation have reverted to Forest Service ownership and are no longer maintained; a majority of these have been breached.

f. Water Quality

At the present, the water quality of streams in the Conservation District is generally good, are suitable for bathing, water related recreation, for the growth and propagation of aquatic life, water fowl, fur bearers, and for municipal, agricultural and industrial water users. The Montana Department of Fish, Wildlife and Parks has classified the main stem of the Bitterroot River as Class 2 (streams of statewide value) from the confluence of the East and West Forks downstream for a distance of approximately 25 miles. The remainder of the river was classified as Class 3 (streams of value to large districts of the state) for a distance of 60 miles. The main stem is not recommended for drinking water.

1.32 Land Resources

a. Land Use and Ownership

TABLE 4.

Ravalli County Land Area
Non-Inventory and Inventory Acreages
1958 and 1967

		Non-Inventory Acreages[1]				Inventory Acreages[2]
	Total Land Area	Federal Non-Cropland	Urban and Built-up	Small Water Areas	Total	
1958	1,525,760	1,102,980	7,744	5,600	1,116,324	409,436
1967	1,525,760	1,111,521	7,785	5,600	1,124,906	400,854

1 - Non-inventory acreage includes federal non-cropland, urban and built-up areas, and small water areas 2 to 40 acres in size.

2 - Inventory acreage includes private, state and Indian-owned lands, including tribal lands.

Source: Montana Soil and Water Conservation Needs Inventory. State Conservation Needs Committee; SCS, Bozeman, Montana, 1970.

TABLE 5.

Ravalli County Land Use Acres
in Inventory
1958 and 1967

Year	Total Inventory	Cropland[1]	Pasture[2]	Range[3]	Forest[4]	Other[5]
1958	409,436	103,500	10,000	101,236	177,000	17,700
1967	400,854	67,488	64,500	95,333	162,649	10,884

1 - Wild hay and mountain meadows cut for hay went from range use to hayland use.

2 - Some meadows used for haying are being used for pasture.

3 - Rangeland decrease is partially due to change in category, see 1.

4 - Forest experiment station data used in 1967 study.

5 - Small areas of shale and rock outcrop were excluded from this use.

Source: Montana Soil and Water Conservation Needs Inventory. State Conservation Needs Committee, SCS, Bozeman, Montana, 1970.

The rapid population growth in the District, as noted in Table 1, is causing an intensive demand for land, dwellings, recreation and highways. Demands for development are rapidly causing encroachment on our better agricultural lands. (Refer to Appendices D-6, "Land Use"; and D-7, "Land Ownership".) Farmland, once converted to subdivisions, has a higher value per acre. The following tables reflect the changes discussed above.

TABLE 6.

Ravalli County Subdivision Activity of Record*
1974 to 1979

	1974	1975	1976	1977	1978	1979
No. Subdivisions Denied	2	0	0	1	0	3
No. Subdivisions Approved by County	6	7	8	65	119	44
Total Number of Lots	76.73	103.00	80.00	369.00	800.00	374.50
Total Number of Acres	78.195	131.952	366.742	1,125.359	2,579.42	1,158.82
Average Size of Lots (acres)	1.02	1.28	4.58	3.05	3.22	3.09
Average No. of Acres/Subdivision	13.03	18.85	45.84	17.31	21.68	26.34
Average No. of Lots/Subdivision	12.79	14.71	10.00	5.68	6.72	8.51

Source: Ravalli County Planning Board, Ravalli County, Montana.

*Note: Many subdivisions legally escape review and are not recorded as such. The data shown above reflects a portion of the land that has been subdivided.

b. Agriculture

Agriculture is a major industry in the Conservation District. The majority of the agriculture land is situated along the valley floor, with some land on lower benches being used for farming. Livestock production accounts for the largest portion of the agricultural economy.

The number of farms in the District continues to decrease each year, while the average farm size has increased. In 1959, there were a total of 1,178 farms compared to 847 farms in 1974. Compared to 1962, there is presently a greater percentage of farm land being used for the raising of livestock compared to raising crops. The gross income per farm was $5,976 in 1963, and $14,926 in 1974; an increase of 149.77 percent in eleven years. The average age of a farm operator in 1974 was 51.1 years.[1]

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[1] U.S. Department of Commerce, Bureau of the Census, Census of Agriculture, Montana, Fol. 1, 1974.

TABLE 7
APPROXIMATE ACREAGES BY MAJOR LAND USE AND OWNERSHIP RAVALLI COUNTY, MT 1979

Prepared by Ravalli County Rural Development Committee

	Private	Nat'l Forest	Ravalli County	MT.Dept Fish & Game	State of MT	Burlington Northern	U.S.Fish Wildlife	Totals
Forest Land	(1) 121,600	773,836	--	--	(2) 22,800	21,280	--	939,516
Wilderness Area	--	281,200	--	--	--	--	--	281,200
Rangeland	(1) 94,054	31,800	--	--	(3) 8,045	--	--	133,900
Irrigated Orchard	(1) 800	--	--	--	--	--	--	800
Dryland Field Crops	(4) 6,000	--	--	--	--	--	--	6,000
Irrigated Field Crops	(4) 7,020	--	--	--	--	--	--	7,020
Dryland Hay	(1) 1,000	--	--	--	--	--	--	1,000
Irrigated Hayland	(4) 40,800	--	--	--	--	--	--	40,800
Dryland Pasture	(1) 2,500	--	--	--	--	--	--	2,500
Irrigated Pasture	(1) 62,000	--	--	--	--	--	--	62,000
Irrigated Rotation Hay & Pasture	(1) 6,000	--	--	--	--	--	--	6,000
Primary Transportation Corridors	--	--	(5) 11,600		(6) 860	(7) 364		12,824
Water Surface Bitterroot River	--	--	--	--	(8) 2,900	--	--	2,900
Water Surface Lakes	--	2,700	--	--	--	--	--	2,700
Wildlife Land	--	--	--	(9) 9,800	--	--	(10) 2,800	12,600
Urban	2,000	--	--	--	--	--	--	2,000
Farmsteads, Residences Misc Uses	12,000	--	--	--	--	--	--	12,000
TOTALS	355,774	(11) 1089,536	11,600	9,800	34,606	21,644	2,800	1,525,760

(1) 1970 Conservation needs inventory adjusted for increases in homesites.
(2) Classified Forest Land List, State of Montana.
(3) Classified Grazing Land List, State of Montana.
(4) 1977 Montana Agriculture Statistics, VOL. XVII.
(5) Approximately 1600 miles County Road by 60 foot Right of Way.
(6) Approximately 89 miles State Highway by 80 foot Right of Way.
(7) Approximately 50 miles of Railroad, by 60 foot Right of Way
(8) Approximately 120 miles by 200 feet.
(9) Montana Department of Fish and Game, Game Ranges.
(10) Lee Metcalf Wildlife Refuge.
(11) All National Forest Land is used by some type of Wildlife.

TABLE 8.

Ravalli County Agricultural Data

General[1]	1969	1974
No. of farms	860	847
No. of commercial farms ($2,500 income)	538	509
Average farm size in acres	346	385
Irrigated land in acres	77,635	67,163
Harvested acres	50,767	50,647
Principal occupation, farming	430	431
Principal occupation, other than farm	391	398
Agr. products sold per farm	$11,312	$14,926
Agr. production expenses per farm	$ 8,633	$12,613
Gross income from agriculture	$9.7 million	$12.6 million

Crops - Avg. Yields and Acreages		1969[1]	1974[1]	1977[4]
Hay and grain for forage	2.8 ton	39,715	38,067	17,600
Alfalfa	3.5 ton	16,631	16,248	4,100
Barley	63 bu.	4,293	5,056	1,300
Oats	56 bu.	796	577	600
Wheat	33.8 bu.	3,770	5,061	380
Sugar beets	19 ton	680	400	640
Potatoes	200 cwt.	588	502	328
Fruit orchards		430	317	31
Vegetables for sale		23	33	

Livestock Numbers	1973[2]	1976[2]	1978[5]
Dairy cows	3,210	2,920	2,866
Beef cows	23,679	23,408	29,597
Beef heifers	5,578	4,873	3,374
All sheep	9,705	7,299	5,500
Horses	3,576	4,038	4,140
Chickens[3]	97,000	96,500	117,500

Source: Ravalli County Agricultural Extension Office, 1979.

1 - 1974 Census of Agriculture, Preliminary Report, Ravalli County, Montana.

2 - Ravalli County Assessor, Annual Reports.

3 - Estimates.

4 - Montana Crop and Livestock Reporting Service, 1977.

5 - Ravalli County Assessor's Office, 1978.

c. Soil Surveys and Soils Associations

A standard soil survey for the Bitterroot Valley was published in 1959. A supplement titled, Engineering Properties and Soil Interpretations For Use in Resource Planning and Development, was published in June, 1971. These surveys encompass all cultivable land. Because of the various soil formations and the soil transportation common to this area, the soil pattern is extremely varied and complex. Fifty-six soil series have been correlated, these include 365 types.[1] Variations of soils within farms, and even small fields, produce difficult problems of water resource management.

Within the Bitterroot Valley area there are several distinct types of landscape, on each of which a characteristic group of soils occur in a characteristic pattern. These are soil associations. A soils association normally consists of one or more major soils and at least one minor soil. The soils in one association may occur in another, but in a different pattern. A map showing soils associations is useful to people who want a general idea of the soils in a survey area, who want to compare different parts of this area, or who want to know the location of large tracts that are suitable for certain kinds of land use. More detailed information on individual soils can be found in the Soil Survey: Bitterroot Valley Area, Montana, Series 1951, No. 4. (Also refer to Appendix D-9, "Generalized Soils.")

1.33 Climate

The rugged topography in the Conservation District contributes to a wide range of climatic conditions. (Refer to Appendix D-8, "General Topography.") The lower valley areas generally have higher temperatures than the higher elevations. As discussed previously, the average annual precipitation is greater at higher elevations than it is in the lower valley reaches. Elevations range from 10,175 feet on Trapper Peak west of Conner to about 3,200 feet where the Bitterroot River flows across the northern boundary into Missoula County. The main Bitterroot Mountain range lies along the western boundary of the valley and influences the climate to a large extent.

While winter and spring seasons have mostly cloudy weather, summers are characterized by clear skies and sunshine. Approximately 25 to 30 percent of the days during an average summer are cloudy. A number of thunder storms occur during the summer, but generally spend themselves over the mountains. As autumn advances, mountain rains and snows increase, and remain fairly heavy until late spring. Valley fogs are common during the fall and winter months. The average growing season for Hamilton is 122 days; for Stevensville, about 92 days; and for Darby, about 99 days. Cold air inversions during the winter occur infrequently and are not as severe as in areas east of the Continental Divide. High temperatures can occur in the summer; nonetheless, the nights remain comfortably cool. (Refer to Appendix D-10, "Average Frostfree Season and Wetlands.")

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[1] Soil Survey: Bitterroot Valley Area, Montana, Series 1951, No. 4, USDA-SCS, May, 1959.

TABLE 9.

Ravalli County
Temperature (F°)

1931-71	Mean Monthly	Record High	Record Low
January	25.49°	62°	-36°
February	30.26°	71°	-36°
March	36.22°	74°	-14°
April	45.84°	90°	- 1°
May	54.12°	102°	21°
June	60.08°	100°	29°
July	67.77°	103°	31°
August	65.91°	103°	34°
September	56.82°	98°	18°
October	46.58°	86°	- 1°
November	34.87°	72°	-24°
December	27.99°	66°	-31°
Yearly Average	46.00°	58.9°	33.2°

1.34 Geology

a. General

The Bitterroot Valley proper is a long basin, about 65 miles long and as much as 10 miles wide. It extends from Lolo in the north to Conner in the south, where it splits into two upper valleys - the East Fork and the West Fork, whose streams combine to form the Bitterroot River. To the west, the Bitterroot Mountains rise abruptly with a remarkably even slope, cut by deep parallel canyons. To the east, and far less pronounced in outline, are the foothills that gradually lead up to the Sapphire Mountains.

The floor of the valley is underlain by alluvium of great depth. A well drilled at Corvallis shows that the alluvial deposits are at least 1,100 feet thick, and these deposits are suspected of being up to three times that thick in other places. The physiographic subdivisions of the valley are (1) mountains, (2) foothills, (3) upper valleys, and (4) floodplains. (Refer to Appendix D-11, "Generalized Geology.")

b. Land Forms

(1) Mountains - The Bitterroot Mountains lie to the west of the main valley of the Bitterroot River. This range is part of the eastern boundary of the westside granite which is composed of quartz monzonite. In many places the mountains rise to elevations of more than 9,000 feet. Trapper Peak, near the southern end of the range, is 10,175 feet high. According to Professor David Alt in Roadside Geology, the Bitterroot fault closely parallels Highway 93 through the valley. The face of the mountains, as seen from the highway, is very steep, partly because it is the fault surface, now carved by erosion.

The physiography of the Sapphire Range, on the east side of the main Bitterroot Valley, is in strong contrast to that of the Bitterroot Range. In general, the Sapphire Range resembles a broad dissected plateau. Elevations of peaks range from about 7,000 feet in the north, to more than 8,500 feet in the south. Most of the streams flow northward and converge into a few major creeks before reaching the Bitterroot Valley.

The foothills consist of many low spurs and ridges that ascend gradually from the tertiary benches to the mountains. In the foothills are many gentle slopes of tillable soils.

(2) Foothills - The high fans and moraines of the west side form a set of nearly level to hilly benches at the base of the Bitterroot Mountains from Lolo to Conner.

All except the bench just south of Lolo were formed early in the glacial (Pleistocene) epoch as outwash fans and glacial moraines. The more prominent moraines are south of Lost Horse Creek. The benches have been dissected by the Bitterroot River and the west side creeks; the topography is now undulating to hilly, but the general slope is towards the valley. Only a few remnants of the original fan surfaces are left. The largest of these are on the benches just west of Darby.

The materials under most of the fans and moraines are boulders, cobblestones, and pebbles derived chiefly from granite and gneiss. These have been so strongly weathered that many of them can be crushed by hand. In one area between Big Creek and Sweathouse Creek, the material is mostly gravel derived chiefly from micaceous schists, quartzites, and argilletes.

The high benches of the east side are underlain chiefly by stratified, unconsolidated to weakly consolidated loams, clays, silts, sand, gravels, and volcanic ash of the tertiary period. Except for the ash, the materials appear to be normal alluvial sediments. They are older than the parent materials on the west side. In places, particularly on the Burnt Fork benches, some strata have been lime-cemented into hard masses.

Some of the thicker gravel deposits around the edges of the benches in which the Riverside soils have developed may be of the glacial epoch. The mantles of limey, more or less gravelly, and cobbly fine earth in which the Burnt Fork and Willoughby soils have developed, and the silty wind deposits in which the Amsterdam soils have developed, are also probably Pleistocene.

Only parts of the original surfaces of the tertiary benches remain. The larger remnants occur on benches north and south of Burnt Fork Creek and east of Hamilton. These areas are nearly level to gently sloping and smooth. The intervening areas have been more or less dissected and eroded, and are now gently to strongly sloping. The overall slope is toward the valley. The bench edges are steeply sloping to broken. Local relief around these edges varies as much as 200 feet.

(3) The Upper Valleys - The valley of the West Fork of the Bitterroot River is no more than a mile wide at any point, and in many places it is much less. The narrow floodplain is bordered first on one side and the other by low terraces and fans. These are underlain by loose sands and gravel, derived from a variety of rocks. The alluvium is not especially thick. Bedrock outcrops at some places in the river bed.

Mountains rise precipitously on both sides of the valley. Small remnants of high benches occur where the West Fork joins Nez Perce Fork and Overwhich Creek.

For about 10 miles above Conner, the East Fork flows in a narrow valley like that of the West Fork. The valley widens out at Cameron Creek, north and east of Sula, to form Sula Basin and French Basin. Together, these basins of floodplains and rolling hills cover about 20 square miles. Materials underlying the floodplains are mixed gravel mantled with loams and clays. Parts of the hills are weathered granite outwash like that of the high fans on the west side of the main valley; other parts are tertiary sandstones and silts; and the remainder is weathered granite bedrock. Wind deposited silts and sands mantle some areas.

Before the East Fork reaches Sula Basin, it flows in a narrow mountain valley with a complex topography of floodplains, broken terraces, and fans.

(4) The Bitterroot Floodplains - The floodplains of the Bitterroot River consist of an intricately channeled strip of alluvium which is predominately composed of sand and gravel of mixed origin. The floodplains have been developed by downcutting of the lower edges of the side fans and resorting of the material.

c. Geologic History

The Bitterroot Valley is within the Northern Rocky Mountain physiographic province. This is identified by high, linear mountain ranges separated by narrow alpine and plateau valleys. The Bitterroot Range is the predominant range.

The area is structurally complex, and large areas are underlain by ancient Precambrian (belt) sedimentary rocks. Numerous geologic formations, ranging in age from Precambrian to Quaternary, appear for this area on the Geologic Map of Montana. Rocks of igneous and volcanic origin cover a large part of the Conservation District, with acid igneous formations of the westside granite occupying the greatest area.

Lake Missoula, an ancient glacial lake, was created in part by melt water from the Pleistocene Cordilleran ice sheet. The Bitterroot Valley was inundated by the lake to an elevation of 4,350 feet, and extended to approximately a mile south of Medicine Hot Springs. A prominent terrace from the lake can easily be identified near Missoula at an elevation of 4,100 feet. As many as 40 other terraces have been recognized at elevations between 3,100 and 4,100 feet.

The oldest formations exposed are Precambrian rocks. Remnants of tertiary and quaternary formations and carbonate rocks occupy the valley. Tertiary bench gravels and "lake bed" deposits of silt, sand, gravel, volcanic ash, and impure limestone are found in the northern part of the Bitterroot Valley. Gold-bearing gravels are present in many stream beds within the valley.

d. Mineral Resources

Mining of minerals has occurred in the Conservation District from the time Major Owen found gold near Stevensville in 1852 to the present. Metalliferous prospects are scattered throughout the Bitterroot and Sapphire Mountain Ranges with a sizeable portion of metal production coming from the Curlew District west of Victor. The mined metals include gold, silver, zinc and copper. Considerable placer gold was recovered from Hughes Creek in the West Fork area.

Metals recovered throughout the Conservation District include gold, silver, copper, lead and zinc. Non-metals recovered include barite, clay, coal, fluor, pumicite and vermiculite. The most productive of these mines today is the vermiculite mine in the Sapphire Mountains east of Victor.

1.35 Vegetation Survey

a. Forests

There are five major forest types of commercial importance in the Bitterroot Conservation District:

1. Douglas fir
2. Ponderosa pine
3. Lodgepole pine
4. Spruce-fir
5. Western larch

Western red cedar, grand fir, subalpine fir, whitebark pine, and cottonwood occur in limited amounts. Subalpine larch and juniper exist as unique forest species at the higher elevations in the Bitterroot Mountain range; however, they have no value as a commercial species.

There has been an increased interest in the protection of our forests from insects and diseases. The Forest Service conducts annual aerial surveys and ground detection surveys designed to discover incipient pest populations. The Forest Service provides an annual publication, "Forest Insects and Disease Conditions", to review the status of important forest insects and diseases. The following information was obtained from available copies of the above-noted publication in the Bitterroot Forest Service offices in Hamilton, Montana.

1964 - Increase of damage caused by pine beetle; dwarf mistletoe is a primary forest disease in the region.

1965 - Mountain pine beetle is the most destructive bark beetle in the region; dwarf mistletoe is not as severe as previously, due to cool, moist weather and an early freeze in September which reduced seed dissemination.

1966 - Mountain pine beetle infestation levels increased slightly over 1965.

1967 - Outbreaks of mountain pine beetle increased in lodgepole and ponderosa pine stands; dwarf mistletoe constituted a major disease problem in the region.

1968 - Damage by mountain pine beetle continues to increase in mature lodgepole, ponderosa and white pine stands.

1969 - Severely cold temperatures, predators and parasites have kept pine beetle populations at low levels; dwarf mistletoe, although slow to spread, continues to be one of the major causes of growth reduction on forest trees in the region.

1970 - Mountain pine beetle infestations continue; budworm infestations intensified in mixed coniferous forests; dwarf mistletoe continues as the major cause of growth reduction of forest trees in the region.

1971 - Mountain pine beetle infestations continue; western spruce budworm infestations continue to increase and spread northward; dwarf mistletoe is still the most important disease problem in the region.

1972 - Epidemics of mountain pine beetle continue in white pine; western spruce budworm defoliation continues to cause extensive permanent injury; funds to control dwarf mistletoe were withdrawn for the region, and the disease continues to spread more extensively.

1973 - Western spruce budworm damaged about 3.5 million acres of fir and spruce in northern Idaho and Montana. Pine butterfly populations declined on the Bitterroot and Lolo National Forests. White pine weevil caused extensive damage to young spruce throughout the area.

1974 - Lodgepole pine stands continue to sustain heavy losses by the mountain pine beetle, with new infestations noted; western spruce budworm defoliation continues; a number of new infestations of dwarf mistletoe were noted. Stocking density of the forest is believed to have a greater impact on the growth of the trees than does the dwarf mistletoe infestation.

1975 - Second-growth ponderosa pine stands were heavily infested by mountain pine beetle; western spruce budworm continues to be a major forest insect pest; dwarf mistletoe control was resumed in conjunction with normal timber management functions.

1976 - Spruce budworm continues to be a major pest in the region; losses caused by mountain pine beetle have increased; dwarf mistletoe control was continued in conjunction with normal timber management activities; Dutch elm disease is identified in Missoula.

1977 - Western spruce budworm continues to be a major pest in the region; the mountain pine beetle is the major tree killer in the region; dwarf mistletoe is still one of the major damaging organisms in the region; Dutch elm disease found in Ravalli County for the first time.

1978 - Areas infested by mountain pine beetle decreased from 1977 to 1978; dwarf mistletoe continues as a major damaging organism in the region; Dutch elm disease is noted again in Ravalli County.

b. Weed Species

The following is a listing of the major weed species as identified by the Ravalli County Weed Board, their usual location in the District, and the acreage infested, where known:

1. Canada thistle - found in crops, pastures, meadows and waste places; in rich, heavy soils, covering approximately 10% of the irrigated land, about 7,700 acres.

2. Leafy spurge - found in waste areas, pastures, roadsides, cultivated fields, and sandy banks; a serious weed because of its spreading nature and persistence.

3. Whitetop - found in cultivated fields, grainfields, grasslands, waste places, meadows and roadsides.

4. Russian knapweed - found in pastures, grainfields, cultivated fields, meadows, waste places, roadsides and irrigation ditches; pest in corn, alfalfa, sugar beets, forage and seed crops.

5. Field bindweed - found in uncultivated areas and waste places, grainfields, and gardens; able to grow under most cultivated conditions.

6. Perennial sowthistle - found in cultivated lands, wastelands, and grainfields.

7. St. Johnswort - found in waste places, overgrazed pasture, and dry, sandy and open soils.

8. Toadflax species - found in roadsides and near dwellings, spreading to valley and sagebrush flats.

9. Spotted knapweed - found in sterile, gravelly, or sandy pastures, old fields, and roadsides; covers entire District.

10. Common tansy - found along ditches and canals.

11. Tall buttercup - found in fields, pastures and meadows; introduced in lawns and heavy moist soils, does not persist under cultivation; covers about 15,000 acres.

12. Musk thistle - found in grasslands.

All of the weed species listed above are considered to be noxious weeds by the Ravalli County Weed Board.

c. Poisonous Plants

1. Silvery lupine (Lupinus argenteus) - found in grasslands; contains poisonous alkaloid, most losses occur from eating the seeds and seed pods; considered dangerous for sheep, however, horses and cattle may occasionally be affected.

2. Death camas - found on both prairies and open woodlands; all parts of the plant are poisonous to cattle, sheep and horses, even when dry; humans sometimes mistakenly eat the bulbs and are poisoned.

3. Waterhemlock - found in wet marshy areas of meadows and pastures; one of the District's most poisonous flowering plants, affecting all warm-blooded animals, including humans; tuberous roots and rootstocks are the most poisonous parts of the plant.

1.36 Fish and Wildlife

There are numerous streams in the Bitterroot Conservation District which support the existence and propagation of several species of fish. The Bitterroot River and a number of its tributaries are considered streams of statewide value based on their accessibility, aesthetics, use and fish productivity.

Native game fish species found in the area include the cutthroat trout, Dolly Varden, and the mountain whitefish. Game fish species that have been introduced into the local streams include the rainbow trout, brown trout, brook trout and arctic grayling. Numerous non-game fish are also found in streams throughout the District. Nearly all of the lakes in the area support game fish populations. There are also three commercial trout farms and a commercial trout hatchery in the District, successfully producing several species of trout.

The physical characteristics of a stream channel upon which fish depend most include adequate combinations of riffles and pools, which are provided by meandering streams. Other habitat qualities required for supporting fish populations are good water quality in sufficient quantity. (Refer to Appendix D-12, "Fisheries.")

Upland game birds in the District include the ruffed grouse, blue grouse, Franklin grouse, Hungarian partridge and the ring-necked pheasant. The pheasant populations have severely declined over the past few years, but efforts are being made by governmental and private groups to reintroduce these birds in suitable areas in the District. (Refer to Appendix D-13, 14, 15, "Upland Game Bird Habitat."

A wide variety of waterfowl inhabit the District during the summer, and a few ducks and geese winter along open streams. Their habitat includes wetlands, glacial potholes and riparian lands along streams and lakeshores.

The elk, a migratory big game animal, moves from high summer mountain areas to lower elevations as snow accumulates during the late fall and winter. Elk populations have been estimated to have remained relatively stable since 1960. Mule and white-tailed deer are also migratory animals, following movement patterns similar to the elk. Deer have spread to more areas of the District since the 1940s. (Refer to Appendix D-16, "Deer and Elk Winter Range.")

Shiras moose are also found in the area. Although moose move from summer to winter range, they follow a different migratory pattern from elk and do not herd.

Mountain goats, well adapted to rugged terrain and high mountain areas, are found throughout the higher elevations and their herds occasionally move to higher areas in the winter to utilize open slopes and cliffs. Bighorn sheep inhabit areas in the District where there is ample browse in combination with rocky cliff areas for escape. Black bear occur throughout the forested areas of the District. The mountain lions enjoy the rough timbered terrain and are found in areas with a good population of prey animals.

Animals common in the District which are classified as furbearers include marten, otter, muskrat, fisher, mink, beaver and raccoon. Predators include bobcat, red fox, silver fox, coyote, civet cat, weasel and skunk. The Lee Metcalf Wildlife Refuge, which contains a large variety of wildlife and wildflowers, is easily accessible.

1.37 Outdoor Recreation

The potential for outdoor recreation depends on the climate, scenic areas, natural areas, historic areas, water, fish and wildlife, population, proximity and access, and ownership and land use. The following is a summary of the potential for outdoor recreation in the Conservation District.

TABLE 10.

Recreation Potential in Ravalli County

Activity	Potential Rating
Cabin sites	High
Camping	High
Picnic and field sports	Medium
Fishing	Medium
Golfing	Medium
Hunting	Medium
Scenic and historic areas	High
Horseback riding	Medium
Shooting preserves	Medium
Vacation ranches	Medium
Water sports	Medium
Winter sports	High

During the winter months, ski runs and snowmobile trails are well used. The Forest Service is expanding a network of trails for cross-country skiing throughout selected areas in the National Forest. There are good ski lifts at Lost Trail Pass. Lost Trail Resort, Medicine Hot Springs and Sleeping Child Hot Springs are open for swimming the year around. Public swimming pools which are located in Hamilton and Stevensville are presently in operation during the summer months. The wilderness and primitive areas are used by trail riders and backpackers. (Refer to Appendix D-17, "Recreation, Historical and Archeological Sites.") There are six fully operational dude ranches in the area. They are the Shining Mountain Ranch near Darby, the High Country Outfitters near Victor, the FWL Guest Ranch south of Hamilton, the Trapper Peak Ranch near Darby, the Wildlife Outfitters near Victor, and the Nez Perce Guest Ranch located in the West Fork area.

1.38 Selected County Statistics

Information from various sources has been collected together in this section to give an indication of some demographic and societal characteristics of Ravalli County and the Bitterroot Conservation District. No attempt has been made to editorialize or analyze the information. One table contains 1970 Census data and is included so that a comparison can be made with the 1980 Census data which is being gathered this year. Other tables contain information for a number of years and are included to show levels of activity.

TABLE 11.

Mountain Bell Telephone Data
Total Number of Instruments Per Exchange Area

Year	Ham. 363-	Corv. 961-	Darb. 821-	Stev. 777-	Vict. 642-	Total	% Inc.
1950	2127*		162	507	118	2914	
1955	2084	304	198	604	155	3345	14.8%
1960	2444	334	374	744	204	4100	22.6%
1965	3397	379	484	829	246	5335	30.1%
1970	4259	594	723	1082	289	6947	30.2%
1975	4855	1188	1035	1803	589	9470	36.3%

TABLE 11. (cont'd)

Dec. 1975	Ham.	Corv.	Darb.	Stev.	Vict.	Total	% Inc.
Residence	3684	1091	831	1582	512	7700	
Business	1171	97	204	221	77	1700	
TOTAL	4855	1188	1035	1803	589	9470	36.3%
Dec. 1976							
Residence	3901	1200	904	1723	599	8327	8.2%
Business	1254	110	227	266	81	1938	9.5%
TOTAL	5155	1310	1131	1989	680	10265	8.4%
Dec. 1977							
Residence	4164	1374	995	1991	645	9169	10.1%
Business	1395	109	241	297	98	2140	10.4%
TOTAL	5559	1483	1236	2288	743	11309	10.2%
Dec. 1978							
Residence	4413	1522	1098	2280	731	10044	9.5%
Business	1499	132	256	342	117	2346	9.6%
TOTAL	5912	1654	1354	2622	848	12390	9.6%
Dec. 1979							
Residence	4663	1686	1147	2532	793	10821	7.7%
Business	1637	154	290	391	138	2610	11.3%
TOTAL	6300	1840	1437	2923	931	13431	8.4%

NOTE: Numbers include main telephones and extensions.
SOURCE: Monthly Record of Telephones, Mountain Bell Telephone, Missoula District.

*(All figures for all years are for the month of December.)

TABLE 12.

Employment and Unemployment in Ravalli County - Annual Average

Year	Civilian Labor Force	Employment	Unemployment	Per Cent Rate
1970	5,470	5,101	359	6.7
1971	5,568	5,188	380	6.8
1972	5,934	5,544	390	6.6
1973	6,128	5,747	381	6.2
1974	6,646	6,150	496	7.5
1975	6,407	5,738	669	10.4
1976	6,771	6,103	668	9.9
1977	7,330	6,609	721	9.8
1978	7,771	7,142	629	8.1
1979	8,100	7,491	609	7.5

Source: Montana Employment and Labor Force, Research and Analysis Section, Employment Security Division, Dept. of Labor and Industry, Helena, Montana, February, 1980.

TABLE 13.

Selected Federal Outlays
in Ravalli County
(Dollar Amounts in Thousands)

Agency/Program	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979
Dept. of Agriculture					
ASCS					
Agr. Conservation	240	69	133	417	165
Salaries & Expenses	19	24	39	56	41
Sugar Act Program	17				
Forestry Incentives		2	8	6	5
FmHA					
Salaries & Expenses	31	37	41	52	46
Emergency Disaster Loans				161	28
Emergency Livestock Loans	291	300	90	90	
Economic Emergency Loans					488
Farm Operating Loans	205	249	232	126	101
Farm Ownership Loans	87		290	179	78
Recreation Fac. Loans				100	95
Low-Mod. Inc. Hsg. Loans	332	838	870	705	690
Rural Rental Hsg. Loans	130	491			
Soil & Water Loans to Individuals		48	48	60	18
Water & Waste Disp. Loans		110	50		
Very Low Inc. Hsg. Repair Loans			5	2	
Very Low Inc. Hsg. Repair Grant					4
RC&D Loan			143		
SCS					
RC&D Operation	94	39	27	10	
RC&D		46	44	51	46
River Basin Surveys & Investigation	2			1	
Snow Survey & Water Supply Forecasting	7	18	1	2	5
Soil & Water Conservation	55	49	76	65	84
Watershed & Flood Prev.		14	172		
Land Inv. & Monitoring			1		2
Cooperative Ext. Service	18	20	17	20	22
Manpower Trng. & Emplmt.	1,458	1,582	1,580	2,149	669
Rural Elec. Loans, REA	591	528	720	587	1,897
National Wool Act Payments	13	26	4	18	23
Feed Grain Prod. Stabilization				47	24
Wheat Prod. Stabilization		4	4	56	58
Forest Service	3,524	2,349	3,819	4,641	6,162

TABLE 13. (Cont'd)

Selected Federal Outlays
in Ravalli County

Agency/Program	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979
Commodity Loans			92	144	
Storage Facility & Equip. Loans			21	43	24
Bur. of Reclamation Loan Program			22		
Emergency Feed Program				32	
Dept. of Interior					
Nat. Wildlife Refuge Fund	7	7	13	11	8
BOR					
Outdoor Recreation	15	11	480	63	152
Land & Water Cons. Fund		2			
Water Resources	60				
Resources Mgmt.	12				
Bird Banding	40				
Fish & Wildlife Ser. Resource Mgmt.		52	68	76	93

Source: Geographic Distribution of Federal Funds in Montana, compiled for the Executive Office of the President, by the Community Services Administration.

TABLE 14.

Ravalli County Population
Selected Characteristics
1970 Census Data

a. Age Distribution

Under 5	5 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 & Over	Total
1,058 (7.3%)	2,945 (20.44%)	2,078 (14.42%)	1,512 (10.49%)	1,480 (10.27%)	1,651 (11.46%)	1,531 (10.63%)	2,154 (14.95%)	14,409

Under 5	5 - 24	25 - 55	55 & Over
1,058 (7.34%)	5,023 (34.86%)	4,643 (32.22%)	3,685 (25.57%)

b. Race

White	Negro	Indian	Oriental	Other	Total
14,132	105	142	14	16	14,409

c. Housing

Total Housing Units	Single-Fam. Units	Multi-Fam. Units	Mobile Homes	Rooming Houses	No Response
5,333	4,404	388	386	49	106

d. Family Income

Aggregate Income	Total Number of Families	Mean Income
$30,030,250	3,795	$7,268

e. Count of Families by Income

$0 - 2,999	$3,000-5,999	$6,000-8,999	$ 9,000-14,999	$15,000-24,999	$25,000-49,999
619 (16.31%)	947 (24.96%)	860 (22.66%)	1,046 (27.56%)	260 (6.85%)	63 (1.66%)

B. Conservation in the Bitterroot Conservation District

2.1 Problem Areas

2.11 Water Quality and Quantity

Water quality data is usually divided into three basic categories, temperature, chemical and biological. The principal sources of specific water quality data on streams within the Bitterroot drainage are the Montana Dept. of Health and Environmental Sciences, the U.S. Geological Survey and the Forest Service. Overall, the water quality of streams within the District are within standards for public health.

The Montana Water Resources Board and staff from the Montana University Joint Water Resources Center have determined that there is no water shortage in the District, but that there is a water distribution problem.

a. Reservoirs

Existing reservoirs in the District hold about 81,000 acre feet of water, of which about 66,500 acre feet are being stored in Lake Como and Painted Rocks Reservoir. The remainder, about 14,500 acre feet of water, is stored in small mountain lakes. Of the two major reservoirs, only Lake Como directly feeds into an irrigation system. Painted Rocks reservoir, originally built in 1938, empties into the Bitterroot River. The dam at Painted Rocks required major repairs during the last ten years. There are not sufficient reservoirs in appropriate locations to help alleviate potential floods, to completely alleviate dry season water shortages, or to provide multi-purpose functions.

b. Pollution Control

1. Point sources of pollution - municipal and industrial wastewater discharge. The city of Hamilton has a sewage treatment plant, built some 25 years ago, which was designed to provide primary treatment of a smaller volume of sewage than the system presently carries. The sewage treatment plant is in need of major repairs. The sewage treatment plant at Hamilton discharges into the Bitterroot River under a discharge permit controlled by the Montana Dept. of Health and Environmental Sciences (DHES). The sewer lines serving the city are ball-joint pipes, designed to allow a certain amount of inflow during periods of high water (June through September, during the irrigation season). The volume of sewage going through the plant fluctuates from about 250,000 gallons per day (gpd) during the non-growing months, to a volume of approximately 2.5 million gpd during the irrigation season.

The plant was not designed and, in fact, does not adequately treat such a large volume of sewage during periods of high flows and volumes. During such times, the sewage moves through the plant at a rapid rate, causing raw sewage to pass through the plant's system. However, the sewage is diluted to such an extent that the parts per million of pollutants measured during quality testing is within acceptable limits.

The cities of Stevensville and Darby have sewage treatment plants of later design and construction, serving much smaller populations than Hamilton. As a result, their effluents are not as great a threat to the water quality of the District.

2. Non-point sources of pollution - diffuse in nature, resulting from agronomic, forestry and crop practices which lessen the quality of water. The majority of non-point pollution is a result of concentrations of livestock, and of poor land use practices which contribute to excessive sediment in streams. Of the agricultural-related water quality problems, excessive removal of surface water for irrigation, and increased sediment in surface water are the most critical. Certain applications of fertilizers, insecticides and herbicides can also cause water pollution. Irrigation severely reduces instream flows in low water years, and creates noticeable local dewatering in the main stem and tributaries to the Bitterroot River. Excessive water withdrawals adversely affect the potential for fisheries, drinking water, recreation, irrigation and industrial uses.

Timber harvest and logging practices both have caused substantial water degradation by increased erosion and sedimentation. Water quality violations, however, are poorly documented because there is insufficient manpower available to monitor the logging operations. Certain timber harvesting practices have resulted in such things as stream channel disturbances, large cuts, eroding roads and skid trails, and logging debris.

c. Streambank and Streamflow Management

The Bitterroot River has been observed to carry large volumes of sediment and to experience substantial bank failure along its length. South of Hamilton, tributaries to the river appear to be undergoing the greatest degradation and bank undercutting. In the Rye Creek watershed, for example, the stream is rapidly undercutting banks and establishing a new floodplain up to fifteen feet below the former level. These disturbances partially reflect adjustments in the slope, bed elevation and overall geometry of the main stem.

The length of the Bitterroot River is also a factor in the changing nature of the stream and its tributaries. According to Kenn D. Cartier and Robert D. Curry in their report on the erosion and stream channel stability in the Bitterroot River watershed, made available in January of 1980, the length of the river between Darby and Missoula was reduced by 2.9 miles between 1936 and 1972. This change accounts for a 4% overall shortening, and a 4% increase in slope. Some channel alterations are associated with road construction or flood control; but many channel changes are a result of the character of the Bitterroot River watershed. Channel adjustments have not occurred evenly over the river's length, but have been concentrated in a few reaches. The extent and rate of these changes suggests a relatively recent disturbance in the watershed's equilibrium. During the past forty years, the Bitterroot River has undergone a major increase in slope and sediment discharge. Apparently, much of the sediment entering the main stem accumulates at the mouths of the contributing tributaries. Eventually, the individual accumulations will merge into a continuous mass of sediment along the length of the river. As the mass grows larger, there will be increasing problems with channel and bank instability.

The changes in the braided character and sinuosity of the river suggest a shift towards higher sediment loads, particularly in the central regions of the valley. A large wedge of material is accumulating along the river course.

Adjustments in the main stem of the Bitterroot River, according to Cartier and Curry's report, were produced by activity in the tributaries; but the alteration to the main stem, in turn, has affected the evolution of side creeks. As the river changed in bed elevation, the side creeks were forced to adjust their slopes and channel geometrics. Minor changes in the main stem trigger major changes in the more susceptible side creeks.

As the Bitterroot River shortened in length, the valley shape changed from a distinctly concave, upward profile towards a straight, ramped profile. The sediment load of the river increased with the increased flow. The faster the water moves, the farther the sediment is carried.

With the introduction of domestic grazing, farming and lumbering, the watershed's natural vegetation and soil characteristics were severely altered or destroyed. The land surfaces, including streambanks, lost stability and experienced rapid and extensive erosion.

2.12 Land Use

a. Floodplain

The rapid population growth in the Conservation District is causing an increased demand for land, including land along the Bitterroot River; the pressure for development is expected to continue. For economical reasons, the farmers and ranchers also have to make more use of their agricultural lands, some of which are adjacent to the river. Land is being subdivided, and homes are being built on the floodplains of perennial streams where there are risks of flood damages. The floodplain is nature's storage area for river water during high flows or during flood stage. At times other than during flood stage, the floodplain looks like a harmless, inviting area in which to develop. Attempts have been made to floodproof structures, but any displacement of flood waters increases and aggravates the problems caused by flooding. The resultant costs of building in the floodplain are borne by the public.

b. Agricultural Land

1. Pastureland, Rangeland

The Bitterroot Conservation District includes about 100,000 acres of dryland and irrigated hay and pastureland. Proper management of these acres would produce maximum yield, and proper irrigation management is essential, regardless of the amount of land involved.

2. Cropland

Lands removed from crop production as a result of subdividing or acquiring rights-of-way are not easily replaced and, in some cases, are not replaced at all. The increasing loss of cropland has become a significant problem in the District. There has been no effort made to give the farmer and rancher a good reason to preserve prime croplands. The increasing population with increasing demands for living space has made it economical to subdivide, regardless of the long-range effect.

3. Spring Runoff

Spring runoff is an important resource to the Conservation District, one on which water rights should be filed. The supply of water during Spring runoff is abundant although adequate measurements of the amount of water during such times has not been available.

c. Urban Areas

Urban development is among the major sediment-producing activities as a result of stormwater runoff and construction activities. Population is more concentrated in urban areas, necessitating sewage collection and treatment facilities for the high density areas. Over time, unless sewage collection and treatment facilities are constantly updated and maintained, the system becomes inefficient and ineffective for transportating and treating sewage. In other areas of relatively high density where septic systems are in use, the ground water becomes polluted. In areas with high water tables, the septic systems do not function.

Urban areas also occur on the fringe of cities and towns, and without adequate controls, become urban sprawl. Urban sprawl is very costly in terms of the extension of services, the removal of land from agricultural uses and wildlife production, and the alteration of surrounding land values.

d. Woodland

The Conservation District's woodlands have a significant role in the area's economy. About three-fourths of the privately-owned forest land is commercial. The wood products industry is second only to agriculture in importance to our economy. The forests affect the basic resources of air, water and soil which, in turn, affect the wildlife habitat, the quality of the environment, and the quality of life for people.

Woodlands deserve effective actions to improve their use for forage, wildlife and recreation. The timber industry needs to take appropriate measures to improve growth rates, reduce mortality, and improve utilization and marketing. Many factors working together have perilously reduced the amount of timber harvested. Timber harvest and logging practices have substantially contributed to the erosion of land and the sedimentation of streams.

e. Wildlife Habitat

Before the white settlers arrived in the valley, wildlife habitat was obviously not an issue. After the arrival of the farmers and ranchers, their fertile agricultural lands were important providers of fish and wildlife habitat. The more recent division of prime areas into small ranchettes and residences has substantially reduced the wildlife habitat. More and more residents and non-residents are fishing and hunting in the District, temporarily occupying wildlife habitat, and creating pressure on wildlife to use less productive areas.

The sportsman and hunter contribute to the area's economy. However, of prime importance is the need to preserve the wildlife habitat which supports all wildlife species. Of secondary importance is the need to maintain a healthy wildlife environment so that sportsmen can continue to contribute to the area's economy. To date, land use controls and land management have not adequately addressed the issue of wildlife habitat.

f. Mineral Extraction

There are a number of deficiencies in present laws and regulations regarding pollution caused by mining. Little has been done to identify potential land disturbance and water quality problems associated with mining in the Bitterroot Conservation District. Some mining laws provide a confidentiality clause which shields certain mining operations from scrutiny, even when they are near streams. Mining activities related to water pollution have not been adequately monitored. There is no vehicle to appraise people involved in mining of their potential impacts and of appropriate procedures to prevent problems.

g. Outdoor Recreation

Outdoor recreation depends on the resources of land, water, climate, air, wildlife and natural beauty. The demands of people, ownership and access all affect outdoor recreation. Outdoor recreation is inevitably in the midst of resource use conflicts.

2.13 Land Ownership

More and more, land is being converted to smaller tracts, and public access to recreation sites is becoming severely limited. Private lands which are converted from open space, from agricultural uses, or from their natural state to more intense uses, all serve to restrict wildlife habitat.

Timber harvest on private lands, without accompanying professionally trained forest managers, has caused the largest reduction in timber production.

Reference is often made to the large amounts of public land in Ravalli County and to the non-tax producing status of public lands. The federal government seeks to alleviate the amount of revenue lost to local governments by providing payments in lieu of taxes. The federal government payments do not replace what would be gained from the land if it were privately owned, but some value, other than dollars, has to be placed on public lands which are retained for reasons and uses which do not have price tags attached.

2.14 Energy Conservation

At present, the Bitterroot Valley has no developed natural gas, petroleum or coal so that energy therefore must be imported. If all the areas needing conversion to pump sprinkler irrigation are to be supplied power, and if housing and commercial activities are developed to accommodate increases in population, then more electricity will have to be provided or such activities will have to be curtailed. Many unnecessary uses of electricity, such as yard night lights and street lights, will have to also be curtailed; efficiency and necessity are becoming the rules of thumb. According to the Montana Power Company, natural gas will be in good supply for the foreseeable future, and is being encouraged for use in heating space and water, where gas lines are available. However, the Montana Power Company and the Ravalli County Electric Cooperative encourage energy efficiency by providing information on energy efficient construction methods and by conducting Energy Audit Programs which provide analyses and recommendations on how to retrofit existing buildings for energy conservation. Work is also being done to develop more efficient street lights, such as the use of 400 watt high pressure sodium lights which provide slightly higher lumens than the 700 watt mercury vapor lights.

The rising costs of petroleum products is driving up the costs of production and transportation for commerce, industry and for the farmer and rancher. The importing and exporting of food and goods are becoming less affordable.

2.15 Selected Diseases in the Conservation District

The presence of the Rocky Mountain Laboratory, a medical research facility of the National Institute of Health, in the Conservation District has resulted in a keen awareness of several diseases which occur locally, which have been intensely studied at the Laboratory, and, in some cases, for which causes and treatments have been determined. Dr. Robert Philip of the Rocky Mountain Laboratory has provided the following basic information about some of the diseases which have been studied at the Laboratory. One of the problems Dr. Philip noted was in the area of disease reporting. It is the responsibility of individual physicians to note and report diseases such as Rocky Mountain spotted fever and Colorado tick fever to the Public Health Service. However, the reporting of the occurrence of these diseases has been far from complete.

During the 1940s, an average of one to two cases of Rocky Mountain spotted fever were reported per year. Prior to 1940, the fatality rate of this disease was around 75%. After antibiotics came into use, the fatality rate dropped to around 5%. Rocky Mountain spotted fever is a rickettsial disease, carried by about 0.5% of the tick population, and all reported cases of the disease in Ravalli County have occurred on the west side of the Bitter Root Valley. During recent times, there have been very few reported cases of the disease. The symptoms include a frontal headache, fever and, at the onset, mild respiratory problems. A generalized body rash is characteristic. Ticks carrying Rocky Mountain spotted fever must attach and feed for several hours in order to transmit the disease to the host; ticks pass the disease onto the next generation of ticks through their eggs. The research performed at the Rocky Mountain Laboratory has resulted in an increased ability to diagnose and treat Rocky Mountain spotted fever, making the disease less of a threat to human life.

Colorado tick fever is a viral disease carried by about 10% of the tick population. The incidence of this disease has remained fairly constant over the years at 15 to 30 reported cases per year. Colorado tick fever is a mild influenzal disease, is rarely fatal and, in the absence of any secondary infection or other debilitating influences, there is usually complete recovery. Reported cases of this disease have occurred on both sides of the valley.

Tularemia, sometimes referred to as "rabbit fever", is a bacterial disease and not usually associated with tick bite. It is frequently contracted by fur trappers who are infected by handling infected muskrats and beavers. The bacteria enter the bloodstream through an opening in the skin, such as a cut or scratch on the hand. The symptoms include the development of a sore at the point of exposure, and enlarged lymph nodes. The disease is mild and usually runs a course of two to three weeks; the occurrence is extremely infrequent, and is easily treated. About every ten years or so, there is an outbreak of tularemia in wildlife, but the disease is less of a problem in the Bitter Root Valley than it is east of the mountains.

C. Long-Range Goals and Objectives

The numbering system within this section is a duplicate of that used in the previous section, Section B., so that a cross-reference can be more easily achieved between the recognized problem areas within the Conservation District and how the District's Board of Supervisors seeks to address the problems. Following each of the goals and objectives, which are directed to particular problem areas, are references to Program Aids. The Program Aids are noted as a means to achieve the goals and objectives, and are individually addressed in the next section, Section D.

2.11 Water Quality and Quantity

a. Reservoirs - To increase the capacity for safe storage of water; to promote safe construction methods and appropriate materials; and to encourage the development of new dams which will provide more water storage capacity in a safe, efficient and durable manner; to promote construction of a hydroelectric generator at Painted Rocks Dam so as to utilize the potential energy stored there in the 33,000 acre foot impoundment for the benefit of inhabitants of the Bitter Root Valley and the State of Montana, and use of funds from the sale of electricity thereby generated to underwrite part of the costs of the objectives outlined in C.2.11 (c).

Program Aids: (Refer to Section D.)

Section 3.3	Montana's Water Rights Law
Section 3.4	State Water Plan
Section 3.5	Soil and Water Resources Conservation Act
Section 3.6	The Natural Streambed and Land Preservation Act of 1975

b. Pollution Control - To preserve water quality; to work toward the restriction or abatement of activities which pollute water; to encourage an educational plan for private forest management.

Program Aids: (Refer to Section D.)

Section 3.1	Section 208 of Public Law 92-500, 1972 Federal Water Pollution Control Act Amendments
Section 3.2	Montana's Water Pollution Control Law
Section 3.3	Montana's Water Rights Law
Section 3.4	State Water Plan
Section 3.5	Soil and Water Resources Conservation Act
Section 3.6	The Natural Streambed and Land Preservation Act

c. Streambank and Streamflow Management - To enforce, encourage and promote programs and projects which will cause bank stabilization of the Bitterroot River, which will reduce the bedload of the river, which will reduce sidestream contributions, which will slow the flow of water in the river, which will stabilize the meandering course of the river, and which will restrict farming and ranching operations to areas away from the river's edge.

Program Aids: (Refer to Section D.)

Section 3.1	Federal Water Pollution Control Act, Section 208
Section 3.2	Montana's Water Pollution Control Law
Section 3.4	State Water Plan
Section 3.5	Soil and Water Resources Conservation Act
Section 3.6	The Natural Streambed and Land Preservation Act

d. Relevant Data - To promote the collection of biological, chemical and physical data which can serve as reference benchmark data in our efforts as outlined in C.2.11 (a) and C.2.11 (b), and as descriptive indicators of current problems and conditions related to water pollution, and streambank and streamflow management of the main stem of the Bitter Root River and its tributaries.

Program Aids: (Refer to Section D.)

Section 3.1	Federal Water Pollution Control Act, Section 208
Section 3.2	Montana's Water Pollution Control Law
Section 3.3	Montana's Water Rights Law
Section 3.4	State Water Plan
Section 3.5	Soil and Water Resources Conservation Act
Section 3.6	The Natural Streambed and Land Preservation Act

2.12 Land Use

a. Floodplain - To promote an economic study to document the cost to the county of building in the floodplain; to prohibit building in the floodplain to achieve better riverbank stabilization; to enforce existing and future laws pertaining to floodplains and; to promote the wisest use of floodplain land by encouraging only those activities and developments thereon which will not endanger the quality of the water, which will not become public liabilities, and which will not contribute to the alteration of the river's course.

Program Aids: (Refer to Section D.)

Section 3.1	Federal Water Pollution Control Act, Section 208
Section 3.2	Montana's Water Pollution Control Law
Section 3.3	Montana's Water Rights Law
Section 3.4	State Water Plan
Section 3.5	Soil and Water Resources Conservation Act
Section 3.6	The Natural Streambed and Land Preservation Act

b. Agricultural Land - To promote biological control of weeds; to promote better range management; to promote more extensive use of the Plant Materials Center located in Montana; to promote the use of available technology to achieve the most efficient and productive irrigation methods.

Program Aids: (Refer to Section D.)

Section 3.1 Federal Water Pollution Control Act, Section 208
Section 3.2 Montana's Water Pollution Control Law
Section 3.4 State Water Plan
Section 3.5 Soil and Water Resources Conservation Act
Section 3.6 The Natural Streambed and Land Preservation Act

c. Urban Areas - To work toward an effective means of persuading the farmer and rancher to preserve prime agricultural land while encouraging the use of land not suitable for agriculture for development; to encourage better control of new subdivisions; to promote the control of increased water runoff from urbanization which causes erosion and sedimentation problems; and to promote better control of point-sources of water pollution.

Program Aids: (Refer to Section D.)

Section 3.1 Federal Water Pollution Control Act, Section 208
Section 3.2 Montana's Water Pollution Control Law
Section 3.3 Montana's Water Rights Law
Section 3.4 State Water Plan
Section 3.5 Soil and Water Resources Conservation Act
Section 3.6 The Natural Streambed and Land Preservation Act

d. Woodland - To encourage woodland owners to more effectively utilize the professional advice and services available from existing public and private agencies; to promote the sustained yield principle; to promote the full and efficient utilization of all materials from timber sales; and to promote forest management principles.

Program Aids: (Refer to Section D.)

Section 3.1 Federal Water Pollution Control Act, Section 208
Section 3.2 Montana's Water Pollution Control Law
Section 3.4 State Water Plan
Section 3.5 Soil and Water Resources Conservation Act
Section 3.6 The Natural Streambed and Land Preservation Act

e. Wildlife Habitat - To work toward a resolution of opposing factions relating to wildlife and agricultural interests; to encourage greater use of conservation easements for wildlife management; to promote the necessity of wildlife habitat maintenance by landowners and; to promote educational programs regarding the many values of wildlife habitat maintenance.

Program Aids: (Refer to Section D.)

Section 3.3 Montana's Water Rights Law
Section 3.5 Soil and Water Resources Conservation Act
Section 3.6 The Natural Streambed and Land Preservation Act

f. Mineral Extraction - To determine what, if any, environmental problems result from the limited mining activities in the Bitterroot Conservation District.

Program Aids: (Refer to Section D.)

Section 3.1 Federal Water Pollution Control Act, Section 208
Section 3.2 Montana's Water Pollution Control Law
Section 3.5 Soil and Water Resources Conservation Act
Section 3.6 The Natural Streambed and Land Preservation Act

g. Outdoor Recreation - To investigate possibilities of expanding public recreation facilities where the need is found; to investigate means of decreasing vandalism of public facilities; to promote control of dogs running at large and; to encourage the preservation of the many historical and archeological sites located in the Bitterroot Conservation District.

Program Aids: (Refer to Section D.)

Section 3.1 Federal Water Pollution Control Act, Section 208
Section 3.2 Montana's Water Pollution Control Law
Section 3.3 Montana's Water Rights Law
Section 3.4 State Water Plan
Section 3.5 Soil and Water Resources Conservation Act
Section 3.6 The Natural Streambed and Land Preservation Act

2.13 Land Ownership - To encourage appropriate public access to public land and water resources while preserving their vital economic values; to work diligently toward a means to maintain adequate land for agricultural purposes, to encourage development on appropriate lands, and to achieve and preserve an overall mix of land uses which are compatible yet fitting; and to promote the best land management practices on public and private lands.

Program Aids: (Refer to Section D.)

Section 3.1 Federal Water Pollution Control Act, Section 208
Section 3.2 Montana's Water Pollution Control Law
Section 3.3 Montana's Water Rights Law
Section 3.4 State Water Plan
Section 3.5 Soil and Water Resources Conservation Act
Section 3.6 The Natural Streambed and Land Preservation Act

2.14 Energy Conservation - To work toward self-sufficiency through conservation and development of alternative renewable energy sources; to promote and support improved technology regarding energy sources and to apply the technology to agricultural, residential, commercial and industrial uses on a small scale basis; to promote and support alternative means of transportation and; to provide educational tools to achieve better efficiency and careful use of available energy sources.

Program Aids: (Refer to Section D.)

Section 3.1 Federal Water Pollution Control Act, Section 208
Section 3.2 Montana's Water Pollution Control Law
Section 3.4 State Water Plan
Section 3.5 Soil and Water Conservation Act
Section 3.6 The Natural Streambed and Land Preservation Act

2.15 Selected Diseases in the Conservation District - To promote a better disease incidence reporting system; to encourage public awareness of the diseases existing in the Conservation District, of the available diagnostic and treatment capabilities, and of the preventive measures which can be taken and; to support and cooperate with the work being done at the Rocky Mountain Laboratory.

Program Aids: (Refer to Section D.)

Section 3.4 State Water Plan
Section 3.5 Soil and Water Resources Conservation Act
Section 3.6 The Natural Streambed and Land Preservation Act

D. PROGRAM AIDS

3.1 Section 208 of Public Law 92-500, 1972 Federal Water Pollution Control Act Amendments (Sec. 208)

Section 208 provides local areas with an opportunity to plan and manage a comprehensive pollution control program for municipal and industrial wastewater, storm and combined sewer runoff, non-profit source pollutants and land use as it relates to water quality. Through a locally controlled planning agency, an area can select a cost-effective and institutionally feasible plan directed to meet the goals of the Act. Particular emphasis is placed upon non-structural approaches to pollution control (e.g. land management) rather than traditional structural measures normally requiring large investments.

Conservation Districts have been given the leadership role in implementing the ways to control non-point pollution within their respective jurisdictions. Section 208 is administered by the U.S. Environmental Protection Agency on the federal level.

3.2 Montana's Water Pollution Control Law, Title 75, Chapter 5, M.C.A., 1979.

The state of Montana has enacted the above law to carry out its public policy to: (1) conserve water by protecting, maintaining and improving the quality and potability of water for public water supplies, wildlife, fish and aquatic life, agriculture, industry, recreation and other beneficial uses; and (2) provide a comprehensive program for the prevention, abatement, and control of water pollution.

The purpose of the state's Water Pollution Control Law is to provide additional and cumulative remedies to prevent, abate and control the pollution of state waters. It is not the intent of the Law to abridge or alter rights of action or remedies in equity or under the common law or statutory law, criminal or civil, nor does the Law or an act done under it estop the state or a municipality or a person as owner of water rights or otherwise, in the exercise of his rights in equity or under the common law or statutory law to suppress nuisances or to abate pollution.

The Montana Dept. of Health and Environmental Sciences (DHES) is responsible for the administration of the state's Water Pollution Control Law. The Water Quality Bureau within the Department is responsible for all functions of the Department concerning matters of water pollution. This involves issuance of waste discharge permits, enforcement of the Law and rules thereof, and carrying out water quality monitoring and investigations. DHES receives policy guidance and direction on issues pertaining to water pollution from the Water Pollution Control Advisory Council.

As provided for in Sec. 2-15-2107, M.C.A., 1979, the Water Pollution Advisory Council consists of eleven members. The members are: The Director of the Dept. of Fish, Wildlife and Parks, the Administrator of the

Water Resources Division of the Dept. of Natural Resources and Conservation, the Director of Agriculture, and eight members appointed by the Governor (1) a representative of industry concerned with the disposal of inorganic waste, (2) a representative of industry concerned with the disposal of organic waste, (3) a livestock feeder, (4) a representative of municipal government, (5) a representative of an organization concerned with fishing for sport, (6) a representative from labor, (7) a supervisor of a Soil and Water Conservation District, and (8) a representative of an organization concerned with water recreation.

DHES is responsible for the establishment and modification of the classification of all waters in accordance with their present and future most beneficial uses; for the formulation of standards of water purity and classification of water according to its most beneficial uses, giving consideration to the economics of waste treatment and prevention; and review, from time to time at intervals of not more than three years, established classification of waters and standards of water purity and classification.

3.3 Montana's Water Rights Law, Title 85, Chapter 2, M.C.A., 1979.

Pursuant to Article IX of the Montana Constitution, the legislature declares that any use of water is a public use and that the waters within the state are the property of the state for the use of its people and are subject to appropriation for beneficial uses as provided in this Law. It is the purpose of this Law to provide for the administration, control and regulation of water rights and establish a system of centralized records of all water rights. The system of centralized records recognizing and establishing all water rights is essential for the documentation, protection, preservation, and future beneficial use and development of Montana's water for the state and its citizens and for the continued development and completion of the comprehensive State Water Plan. It is the policy of the state and a purpose of the Law to encourage the wise use of the state's water resources by making them available for appropriation consistent with the Law and to provide for the wise utilization, development, and conservation of the waters of the state for the maximum benefit of its people with the least possible degradation of the natural aquatic ecosystems. In pursuit of this policy, the state encourages the development of facilities which store and conserve waters for beneficial use, for the maximization of the use of those waters in Montana, for the stabilization of stream flows, and for groundwater recharge. It is further the policy of the state and a purpose of the Law to recognize and confirm all existing rights to the use of any waters for any useful or beneficial purpose.

The Dept. of Natural Resources and Conservation (DNRC) is responsible for the enforcement and administration of the Water Rights Law. DNRC is also responsible for carrying out the rules adopted by the Board of Natural Resources and Conservation pertaining to water rights. As provided for in Sec. 2-15-3302, M.C.A., 1979, the Board is composed of seven members, appointed by the Governor, informed and experienced in the subjects of natural resources and conservation.

3.4 State Water Plan, Title 85, Chapter 1, M.C.A., 1979.

The stated policy which provides the framework for the State Water Plan is declared as follows: (1) The general welfare of the people of Montana, in view of the state's population growth and expanding economy, requires that water resources of the state be put to optimum beneficial use and not wasted; (2) the public policy of the state is to promote the conservation, development and beneficial use of the state's water resources to secure maximum economic and social prosperity for its citizens; (3) the state, in the exercise of its sovereign power, acting through the Dept. of Natural Resources and Conservation, shall coordinate the development and use of the water resources of the state so as to effect full utilization, conservation and protection of its water resources; (4) the development and utilization of water resources and the efficient, economic distribution thereof are vital to the people in order to protect existing uses and to assure adequate future supplies for domestic, industrial, agricultural and other beneficial uses; (5) the water resources of the state must be protected and conserved to assure adequate supplies for public recreational purposes and for the conservation of wildlife and aquatic life; (6) the public interest requires the construction, operation and maintenance of a system of works for the conservation, development, storage, distribution and utilization of water, which construction, operation and maintenance is a single object and is in all respects for the welfare and benefit of the people of the state; (7) it is necessary to coordinate local, state and federal water resource development and utilization plans and projects through a single agency of state government, the Dept. of Natural Resources and Conservation; (8) the greatest economic benefit to the people of Montana can be secured only by the sound coordination of development and utilization of water resources with the development and utilization of all other resources of the state; (9) any attempt to gain control of or speculate on large quantities of ground water of the state of Montana is not in the interest of the people and is to be restricted; and (10) to achieve these objectives and to protect the waters of Montana from diversion to other areas of the nation, it is essential that a comprehensive, coordinated multiple-use water resource plan be progressively formulated, to be known as the "State Water Plan".

The Dept. of Natural Resources and Conservation is responsible for preparing a continuing comprehensive inventory of the state's water resources, for a coordinated multiple-use water resource plan, for preparing a continuing inventory of the groundwater resources of the state, and for working within the guidance and rules established by the Board of Natural Resources and Conservation.

3.5 Soil and Water Resources Conservation Act (RCA), Public Law 95-192, 1977.

The Soil and Water Resources Conservation Act (RCA) is a companion measure to the Forest and Rangeland Renewable Resources Planning Act of 1974. RCA directs the Secretary of Agriculture to (1) appraise, on a continuing basis, the soil, water and related resources on nonfederal land in the Nation, (2) develop a program for furthering the conservation, protection and enhancement of these resources, (3) report to the Congress and the public in 1980, (4) provide Congress with annual evaluation reports, and (5) repeat the process in 1985. RCA is intended to help address increasing demands on basic natural resources, to strengthen the federal, state and local conservation activities, and to assess the many-faceted, decentralized programs within agencies of the U.S. Dept. of Agriculture.

The Soil Conservation Service is responsible for administering the RCA within the overall guidance of the RCA Coordinating Committee. The Committee has eleven members: representatives of each of the nine U.S. Dept. of Agriculture agencies concerned with 34 different soil and water conservation programs, a representative from the Office of Management and Budget, and a representative of the Council on Environmental Quality.

3.6 The Natural Streambed and Land Preservation Act of 1975, Title 75, Chapter 7, M.C.A., 1979 ("310")

It is the policy of the state of Montana that its natural perennial rivers and streams and the lands and property immediately adjacent to them within the state are to be protected and preserved to be available in their natural or existing state and to prohibit unauthorized projects and in so doing to keep soil erosion and sedimentation to a minimum, except as may be necessary and appropriate after due consideration of all factors involved. Further, it is the policy of this state to recognize the needs of irrigation and agricultural use of the perennial rivers and streams of the state of Montana and to protect the use of water for any useful or beneficial purpose as guaranteed by the Constitution of the State of Montana.

Any person engaged in any activity which, if carried out, would physically alter or modify such stream in the state of Montana, which would result in a change in the state of such stream must present written notice of the proposed activity to the Board of Supervisors of the Conservation District before any portion of the activity takes place. The Board of Supervisors must, within 5 days of receipt of a notice, determine if the proposed activity will, in fact, result in a change in the state of such stream; and, if so, the Board of Supervisors must send a copy of their determination to the Dept. of Fish, Wildlife and Parks and to the applicant. The Dept. of Fish, Wildlife and Parks may request an on-site inspection by a team, to consist of one representative of the Board of Supervisors, one representative of the Dept. of Fish, Wildlife and Parks, and the applicant or his representative. The Board of Supervisors shall review the proposed project and affirm, overrule, or modify the team recommendations and notify the applicant and team members of their decision. No work on a project within the realm of this Act may take place without the written consent of the Conservation District's Board of Supervisors. Except for emergency action, a project engaged in by any person without prior approval as prescribed in this Act is declared a public nuisance and subject to proceedings for immediate abatement.

APPENDICES

A. Related Federal Legislation

B. Related State Legislation

C. Memoranda of Understanding and Agreements with the Bitterroot Conservation District

D. Bitterroot Conservation District Resource Maps

1. Drainages, Flood Zones
2. Average Annual Precipitation
3. Average Annual Snowfall
4. Snow Maximum Loads
5. Adequate Snowfall for Potential Ski Areas
6. Land Use
7. Land Ownership
8. General Topography
9. Generalized Soils
10. Average Frostfree Season and Wetlands
11. Generalized Geology
12. Fisheries
13. Upland Game Bird Habitat - Ring-necked Pheasant and Hungarian Partridge
14. Upland Game Bird Habitat - Merriam's Turkey and White-Tailed Ptarmigan
15. Upland Game Bird Habitat - Ruffed, Blue and Spruce Grouse
16. Deer and Elk Winter Range
17. Recreation, Historical and Archeological Sites

E. Permits Necessary for Conservation Practices in Ravalli County

F. Primary Governmental Agencies that Deal with Water Quality

Appendix A.

Related Federal Legislation

1. P.L. 46, Soil Conservation and Domestic Allotment Act of 1936 (U.S.D.A. Secretary's Memorandum No. 1488 of February 1, 1962)
2. P.L. 566, Watershed Protection and Flood Prevention Act of 1954
3. P.L. 87-703, Section 102 of the Food and Agriculture Act of 1962, Resource Conservation and Development Program
4. P.L. 91-190, National Environmental Policy, January 1, 1970
5. P.L. 92-419, Rural Development Act of 1972
6. P.L. 93-86, Title X, Agriculture and Consumer Protection Act of 1973

Appendix B.

Related State Legislation

1. Major Facility Siting Act, House Bill 581
2. Revenue Sharing by Conservation Districts, Senate Bill 141
3. Economic Land Development Act, Senate Bill 672
4. Renewable Resource Development Program, Senate Bill 642
5. Natural Streambed and Land Preservation Act, Senate Bill 310
6. Lake Shore Protection, Senate Bill 175
7. Saline Seep Program on State Lands, House Bill 33
8. Montana Weed Control Law
9. State Subdivision and Platting Act
10. Inspection of Dams, Dikes and Reservoirs, Senate Bill 337
11. Agricultural Land Defined, House Bill 488
12. Open Space Land and Voluntary Conservation Easement Act, House Bill 341
13. Floodplain Rules and Regulations of Dept. of Natural Resources and Conservation
14. Subdivision Regulations of the Dept. of Community Affairs

Appendix C.

Memoranda of Understanding and Agreements with the Bitterroot Conservation District

1. Soil Conservation Service, June 2, 1942
2. Agriculture Stabilization and Conservation Service, June 25, 1963 and May 10, 1977
3. Forest Service, May 7, 1957; annual agreement for rip-rap, June 1, 1979
4. Dept. of the Army, August 31, 1976
5. Montana Dept. of Natural Resources and Conservation, August 31, 1978
6. Montana State Forester, January 20, 1959
7. Montana State Lands, December 6, 1978
8. Montana Dept. of Fish, Wildlife and Parks, September 27, 1966
9. Contractors, March 29, 1956

Appendix D.

Bitterroot Conservation District Resource Maps

1. Drainages, Flood Zones
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3. Average Annual Snowfall
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6. Land Use
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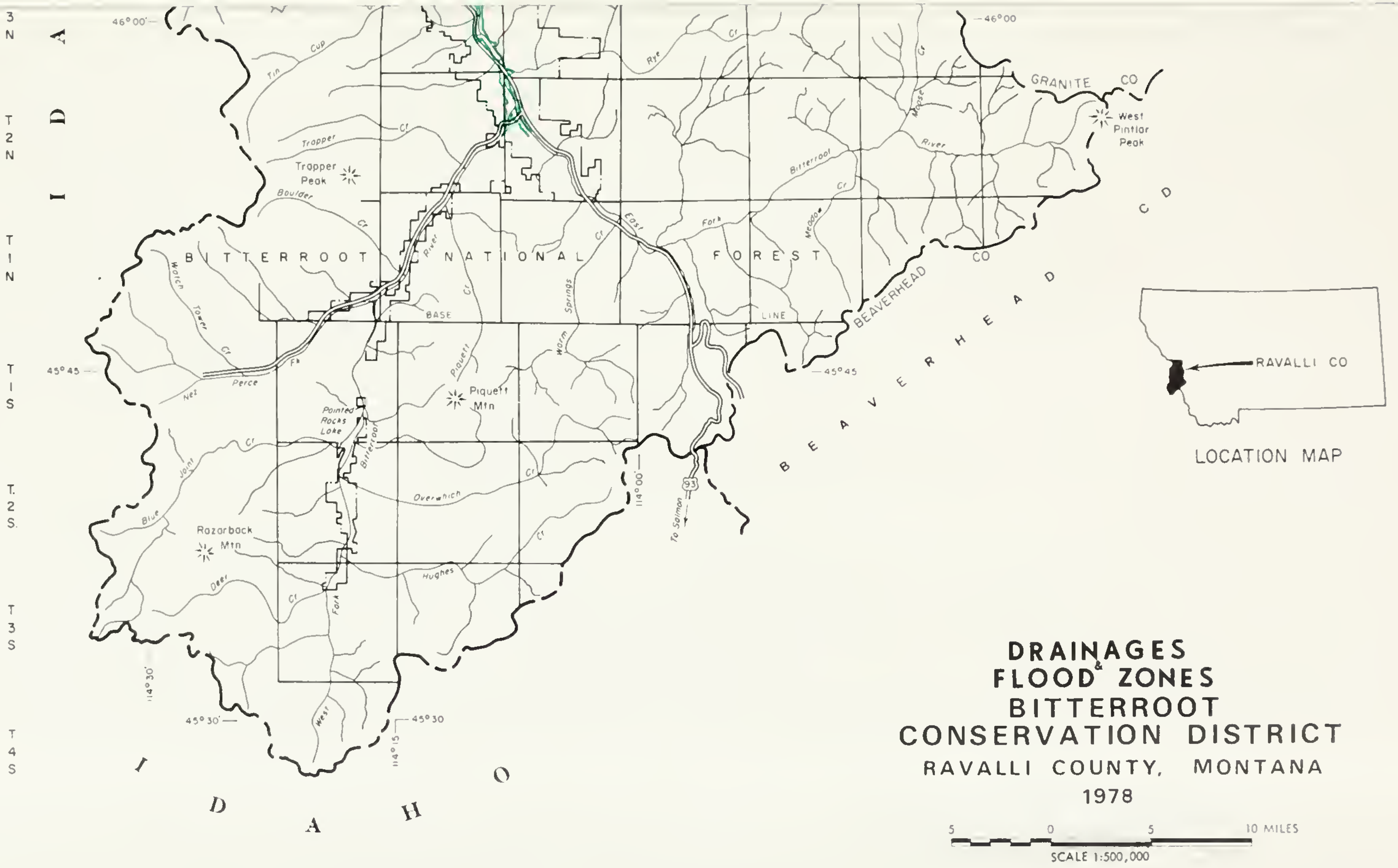
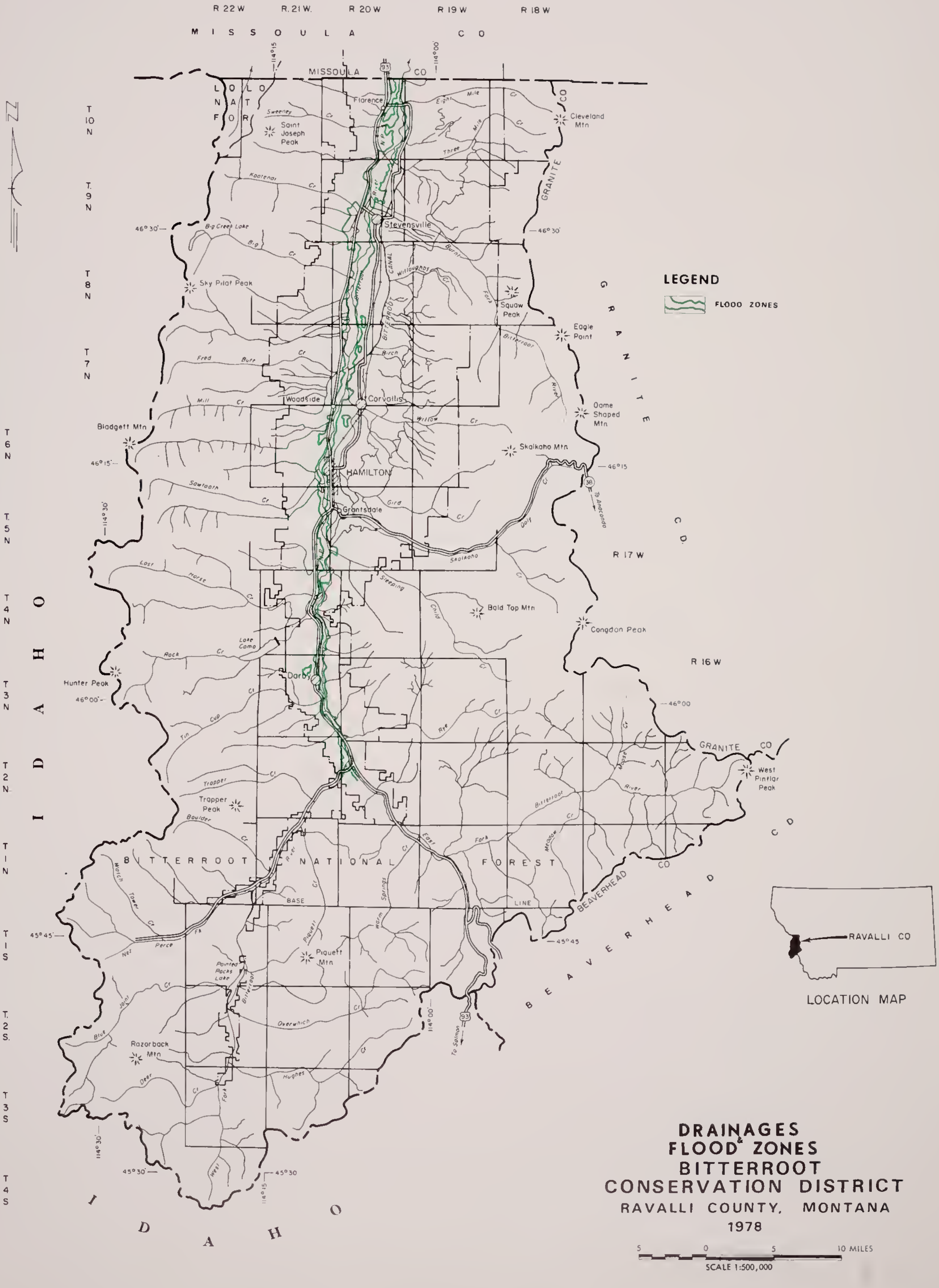
17. Recreation, Historical and Archeological Sites



DRAINAGES & FLOOD ZONES
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978



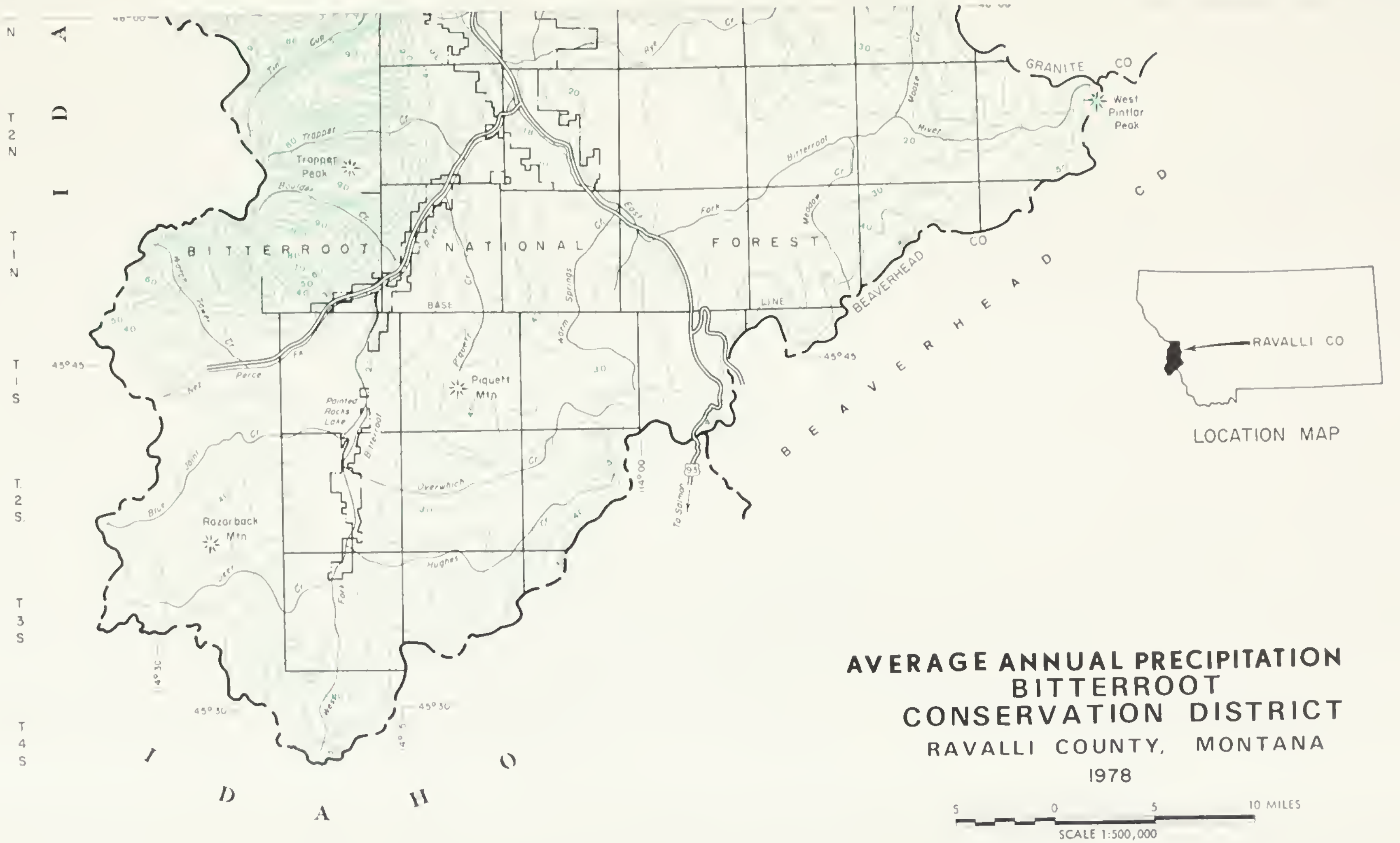
DRAINAGES & FLOOD ZONES
BITTERROOT CONSERVATION DISTRICT

RAVALLI COUNTY, MONTANA
1978

Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

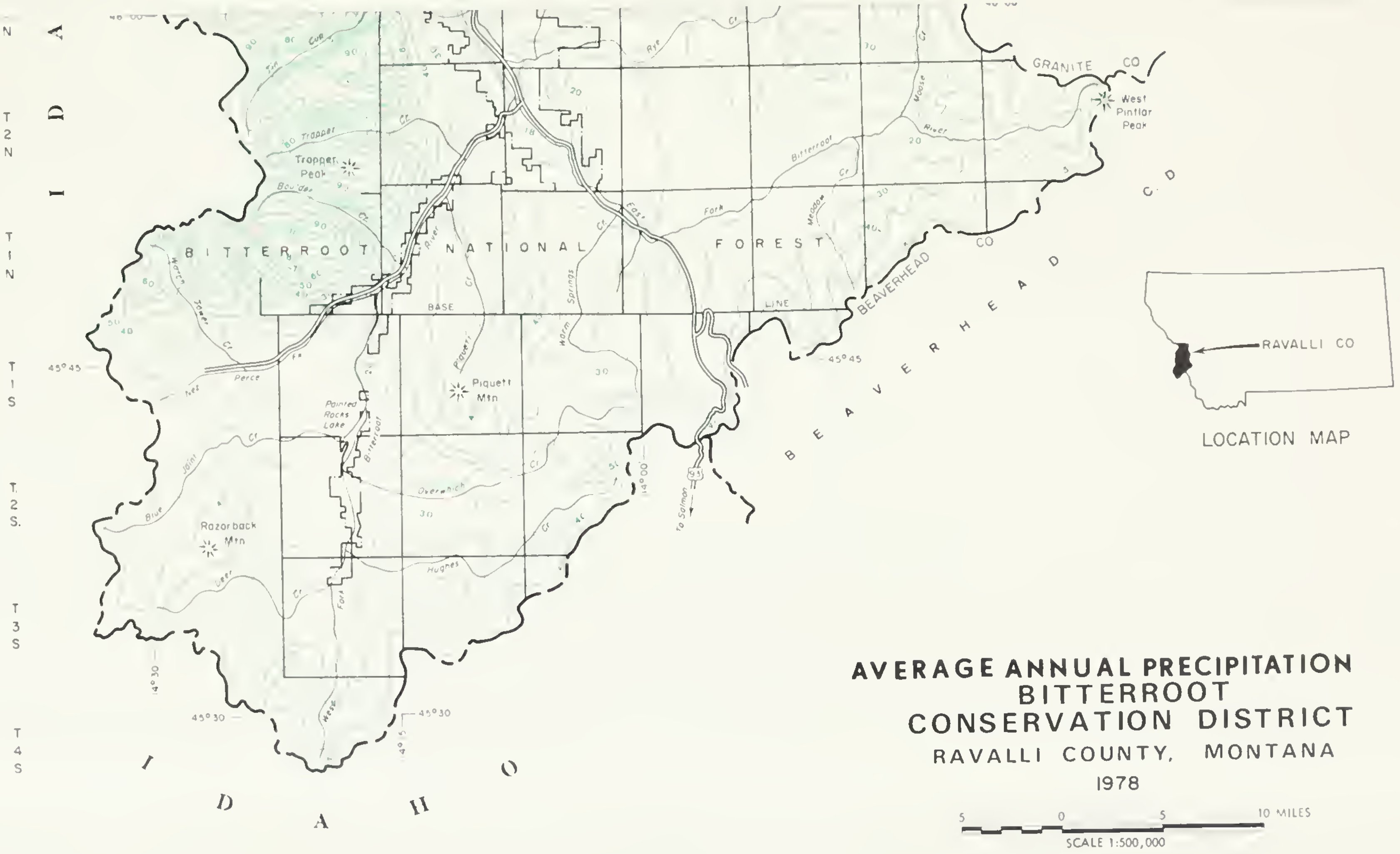
USDA-SCS-PORTLAND OR 1979

M7-EN-23991-4



AVERAGE ANNUAL PRECIPITATION
BITTERROOT
CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

M7-EN-23991-6



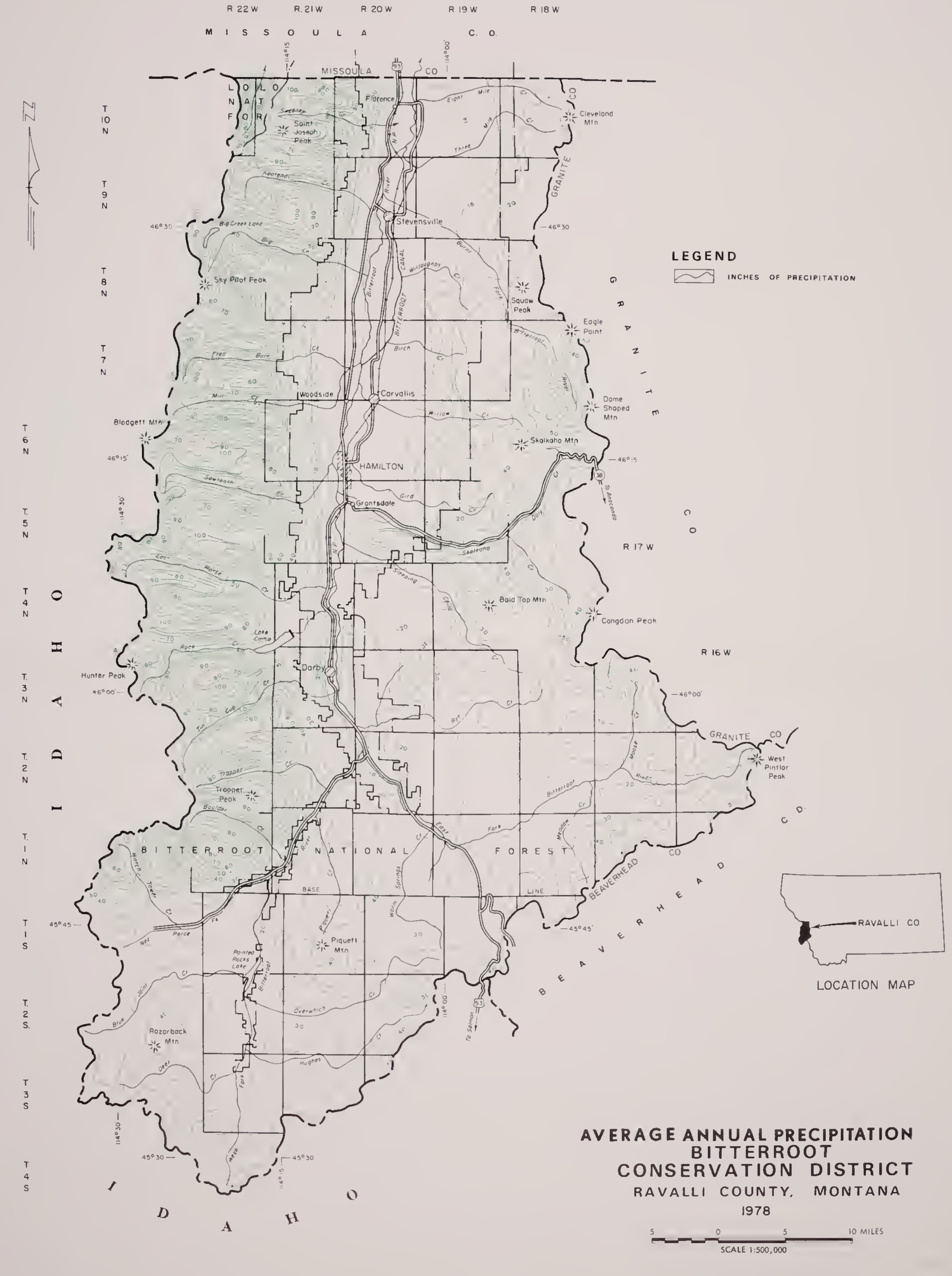
AVERAGE ANNUAL PRECIPITATION
BITTERROOT CONSERVATION DISTRICT

RAVALLI COUNTY, MONTANA

1978

M7-EN-23991-6

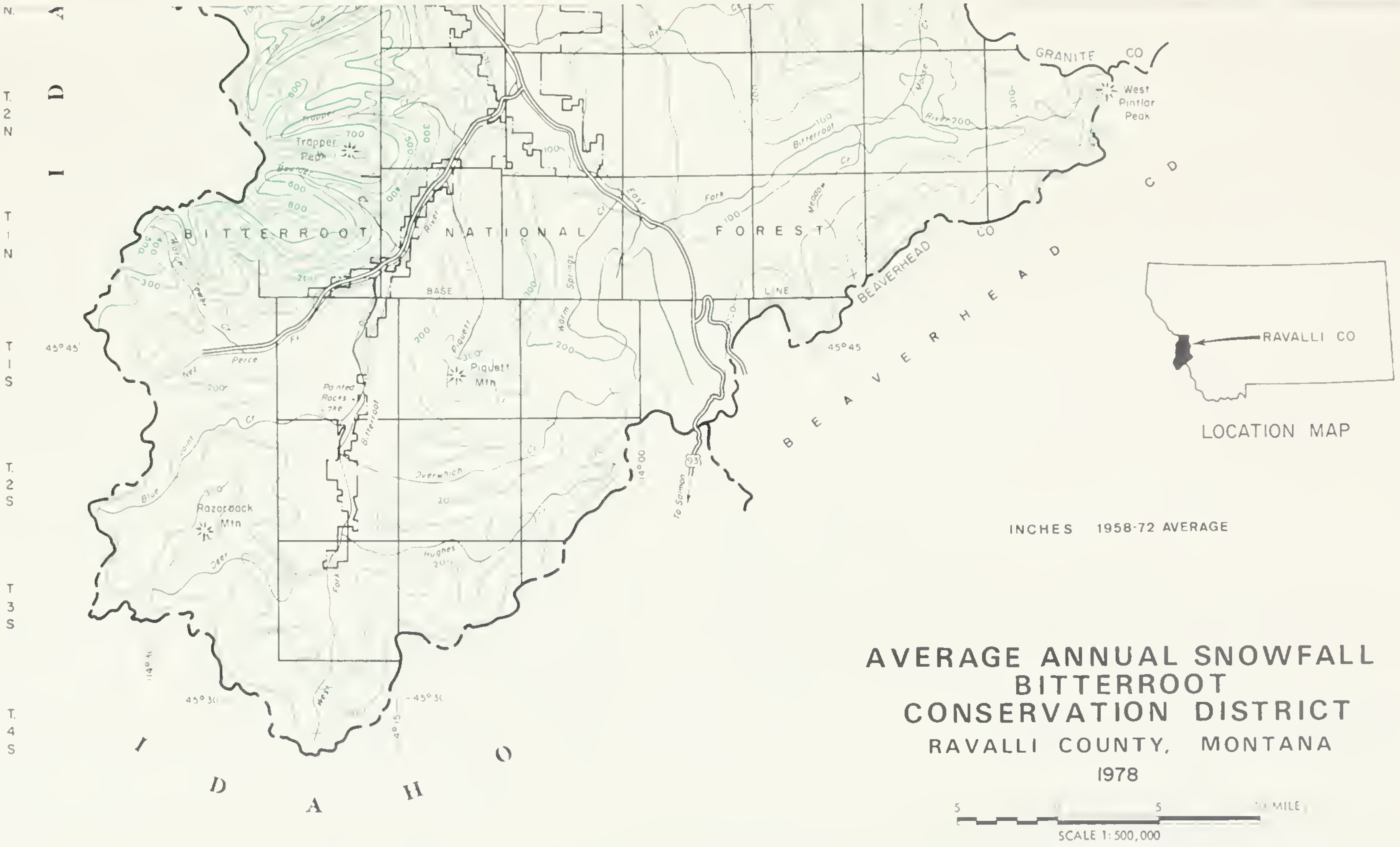
AVERAGE ANNUAL PRECIPITATION
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978



Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

USDA SCS PORTLAND OR 1979

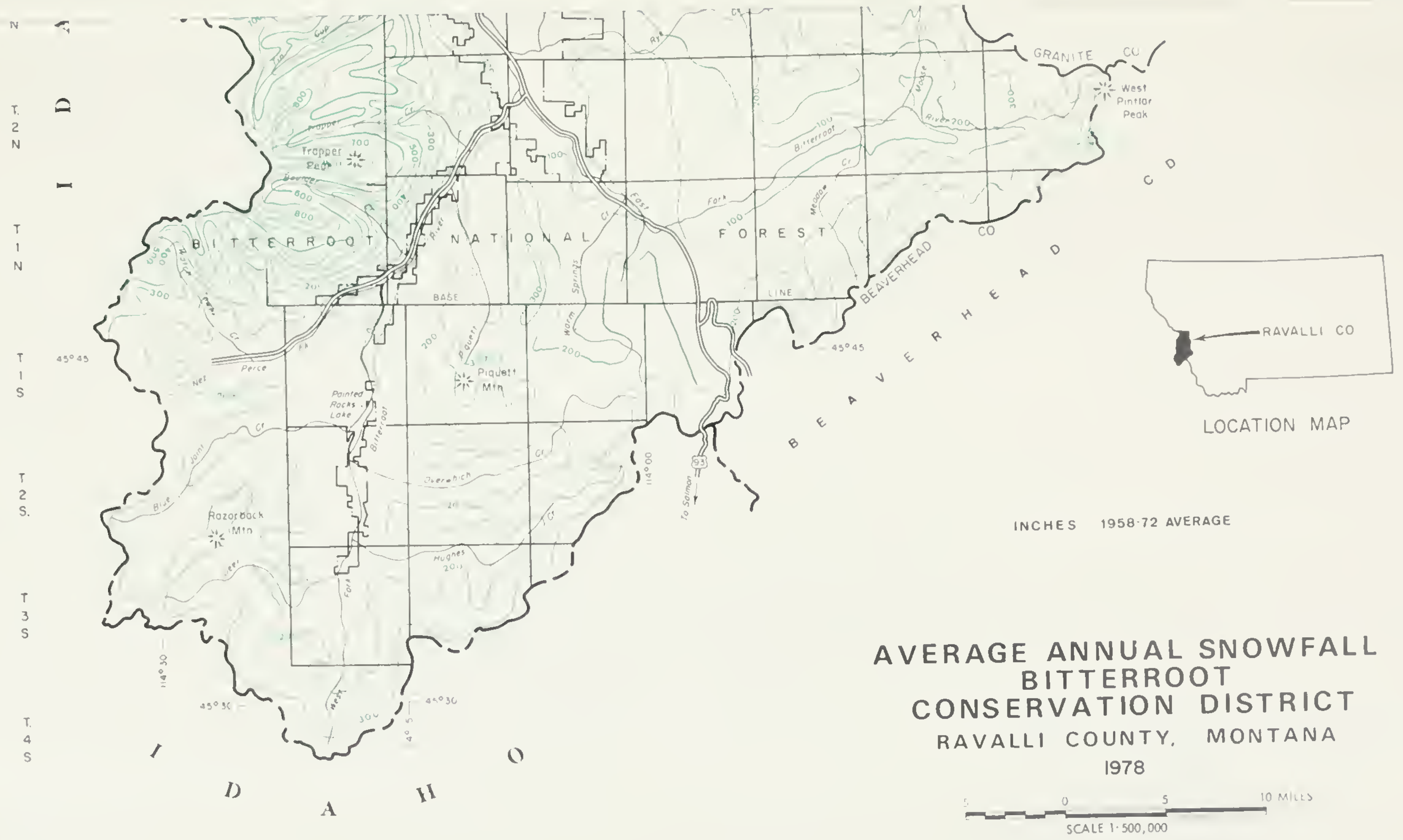
M7-EN-23991-6



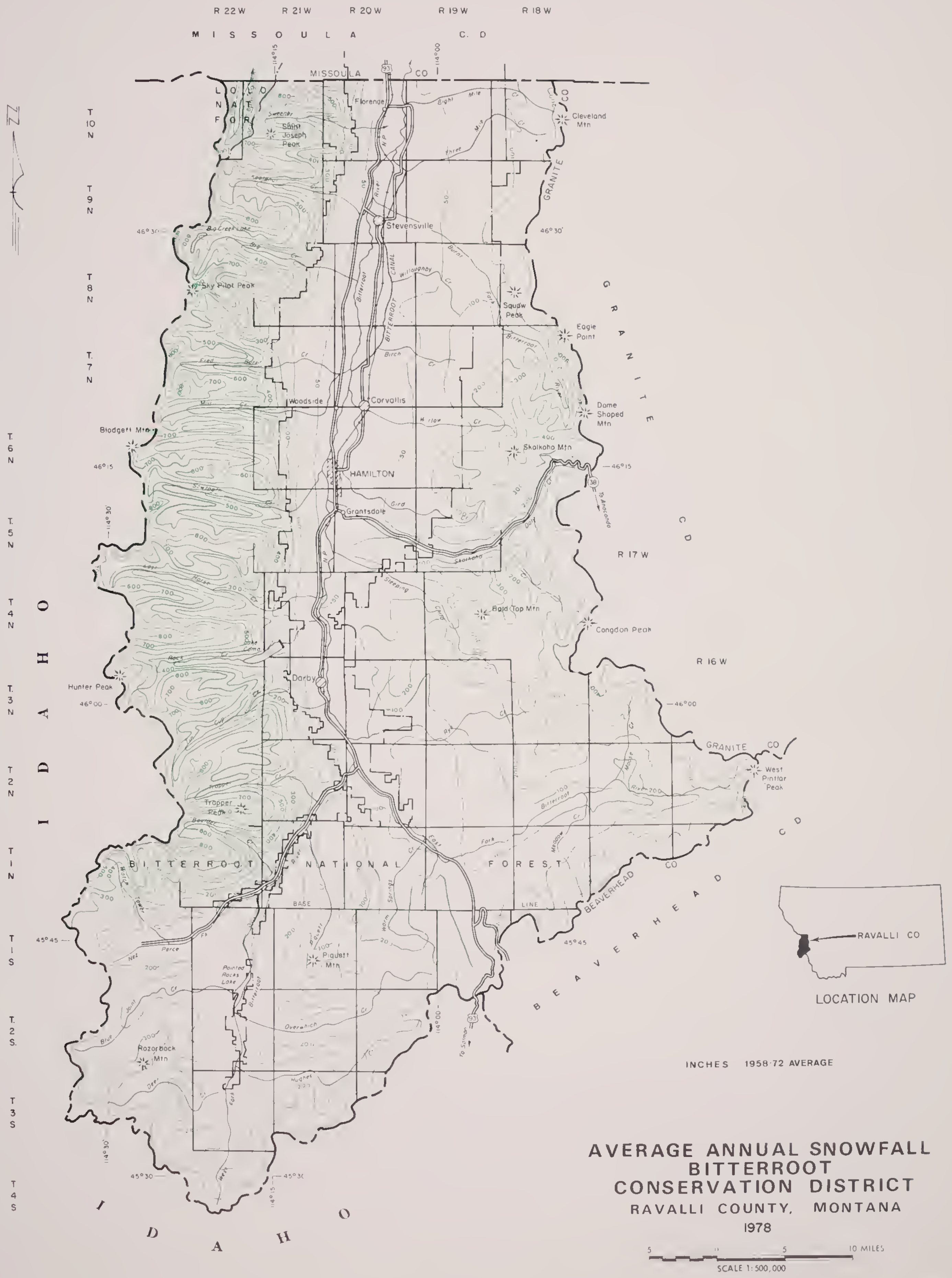
AVERAGE ANNUAL SNOWFALL BITTERROOT CONSERVATION DISTRICT

RAVALLI COUNTY, MONTANA

1978



AVERAGE ANNUAL SNOWFALL
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978



LOCATION MAP

RAVALLI CO

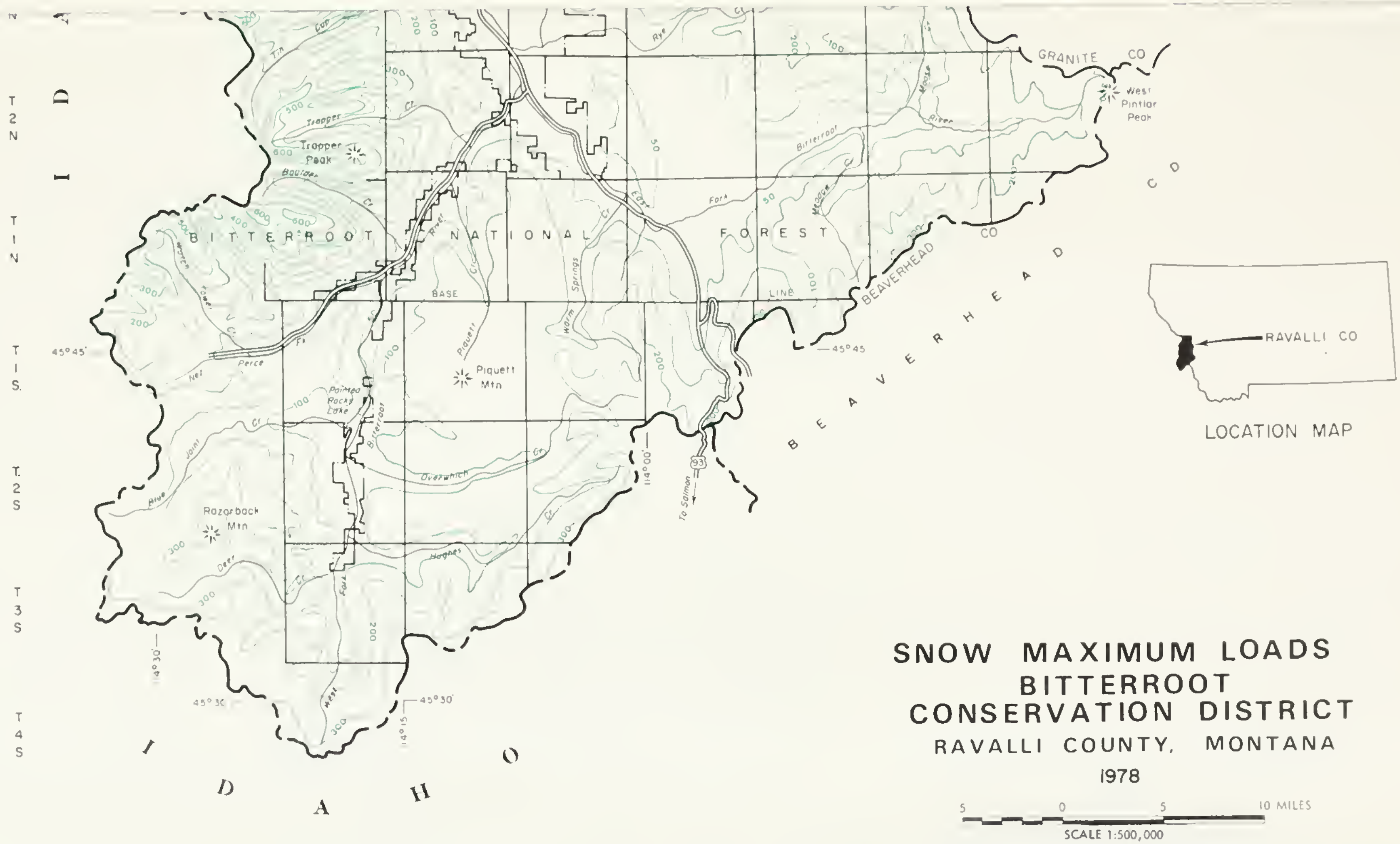
INCHES 1958-72 AVERAGE

AVERAGE ANNUAL SNOWFALL
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

5 0 5 10 MILES
SCALE 1:500,000

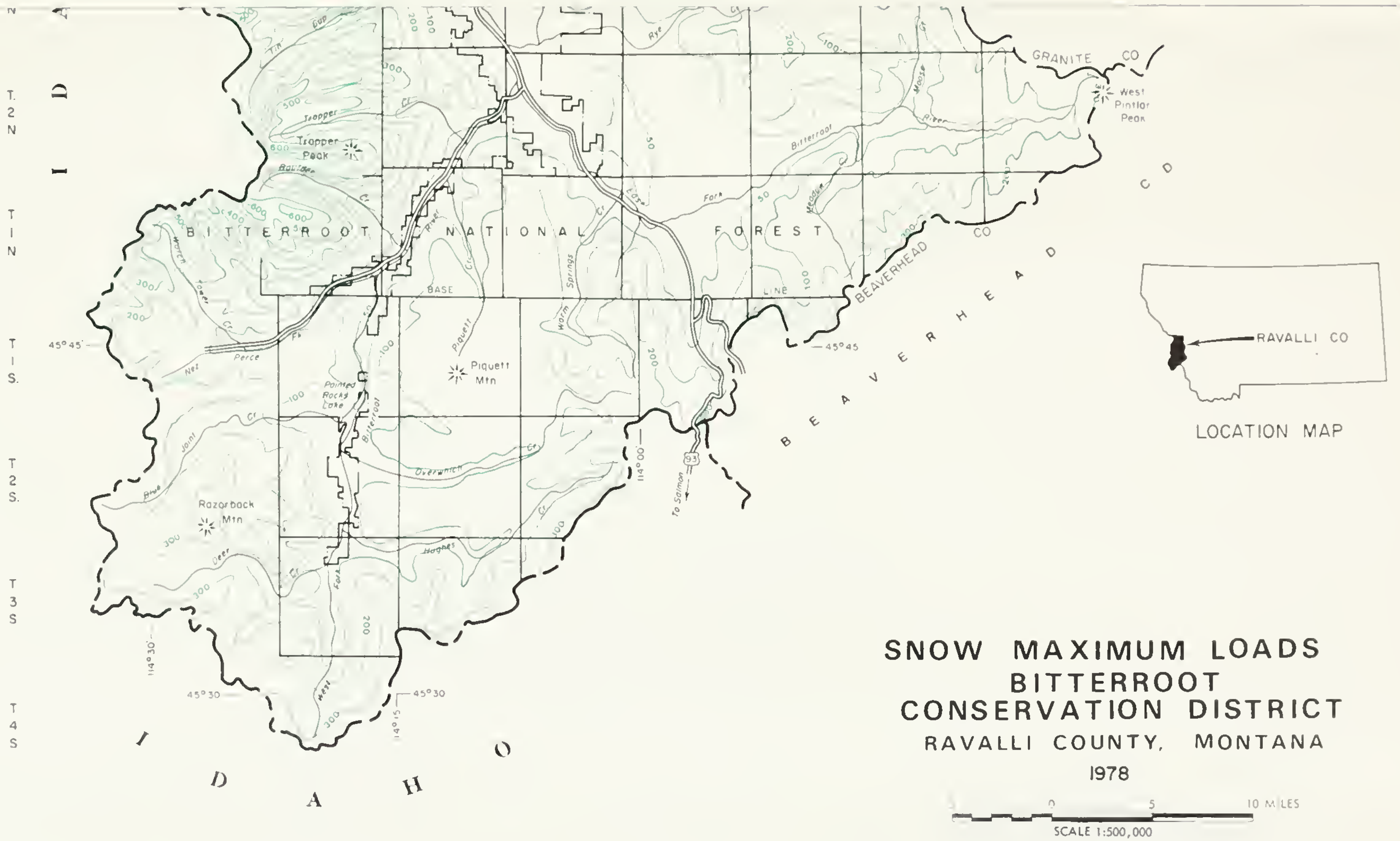
Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

USDA SCS PORTLAND OR 1979



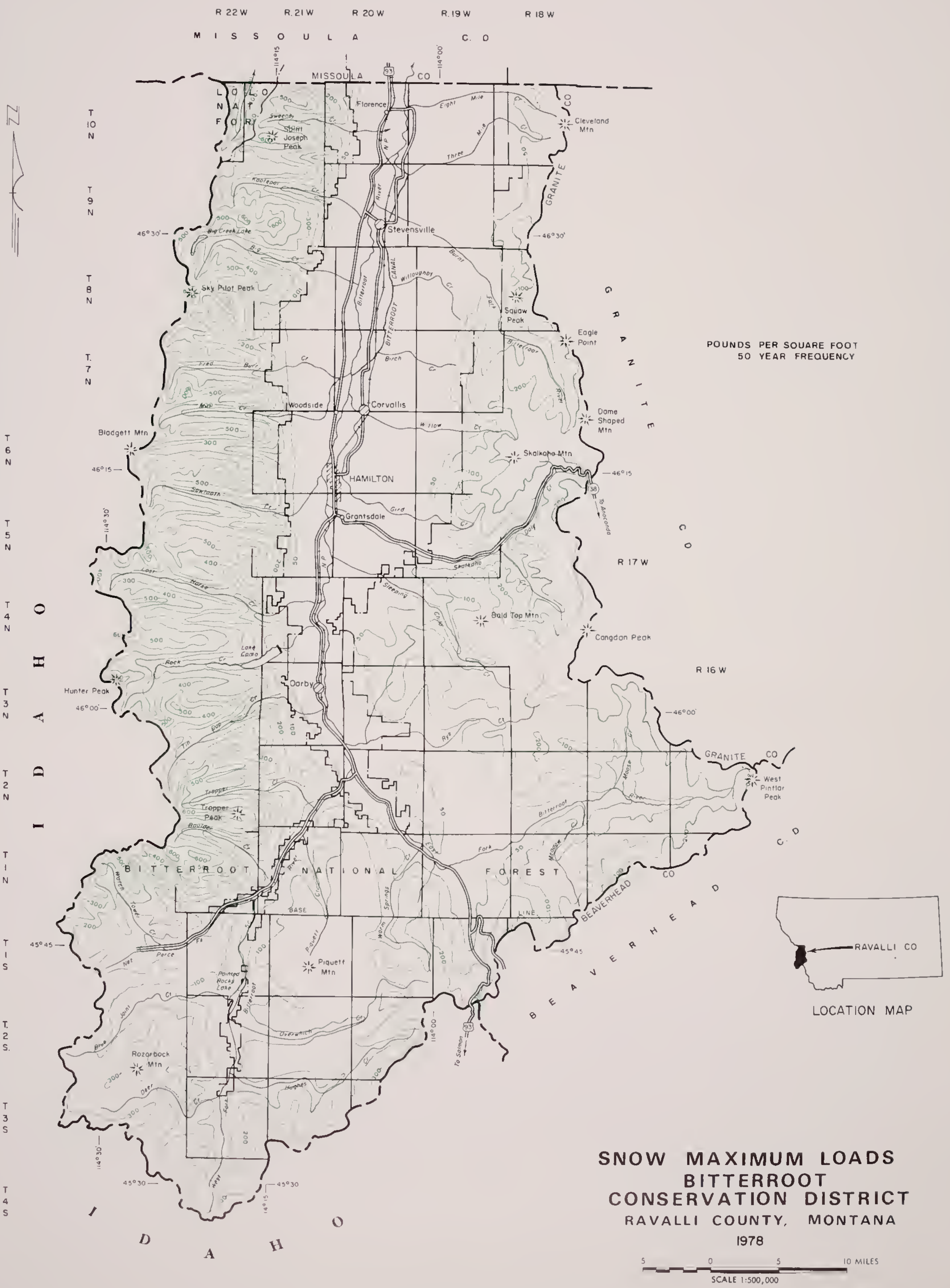
SNOW MAXIMUM LOADS
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

M7-EN-23991-7



SNOW MAXIMUM LOADS
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

M7-EN-23991-7

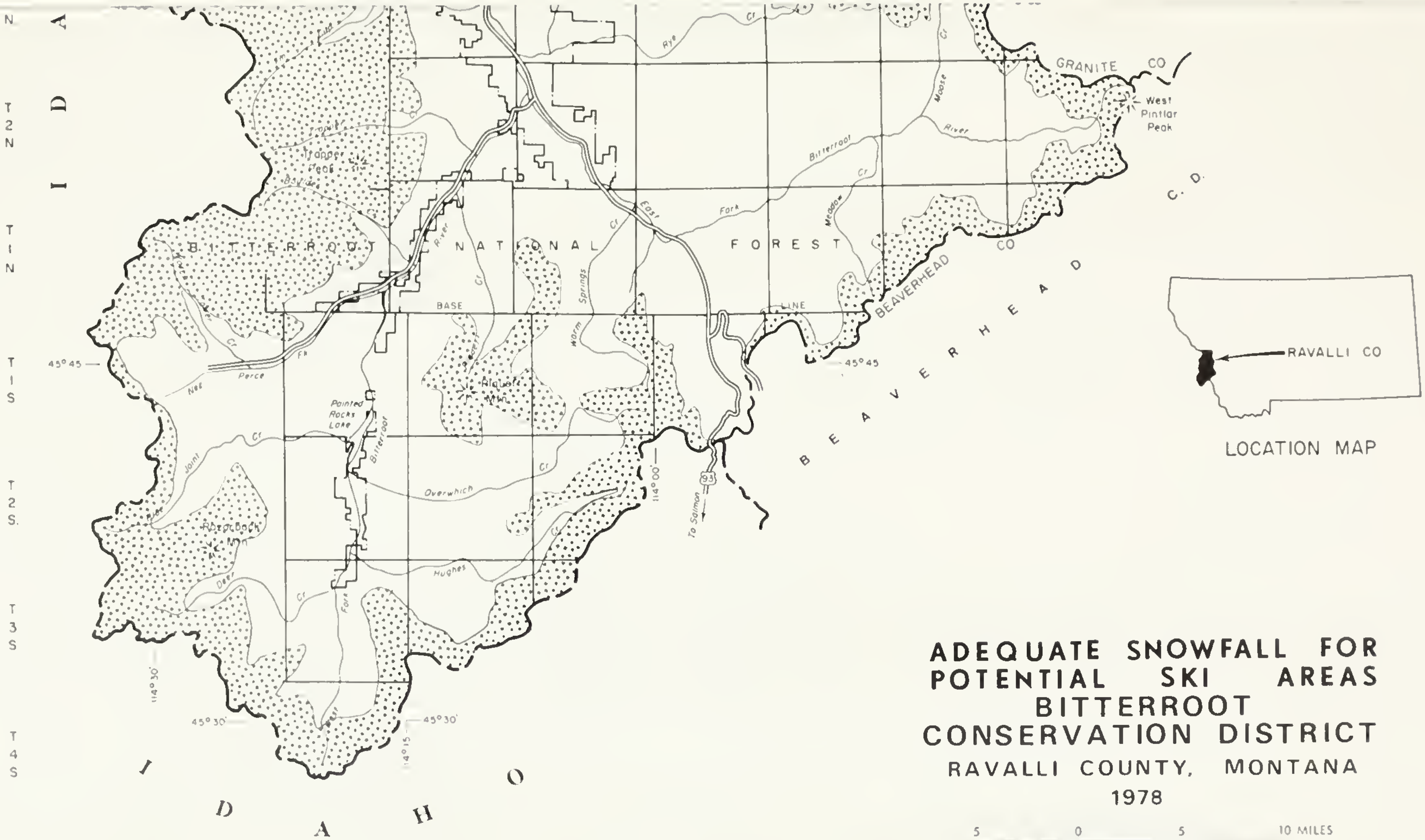


SNOW MAXIMUM LOADS
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
US DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

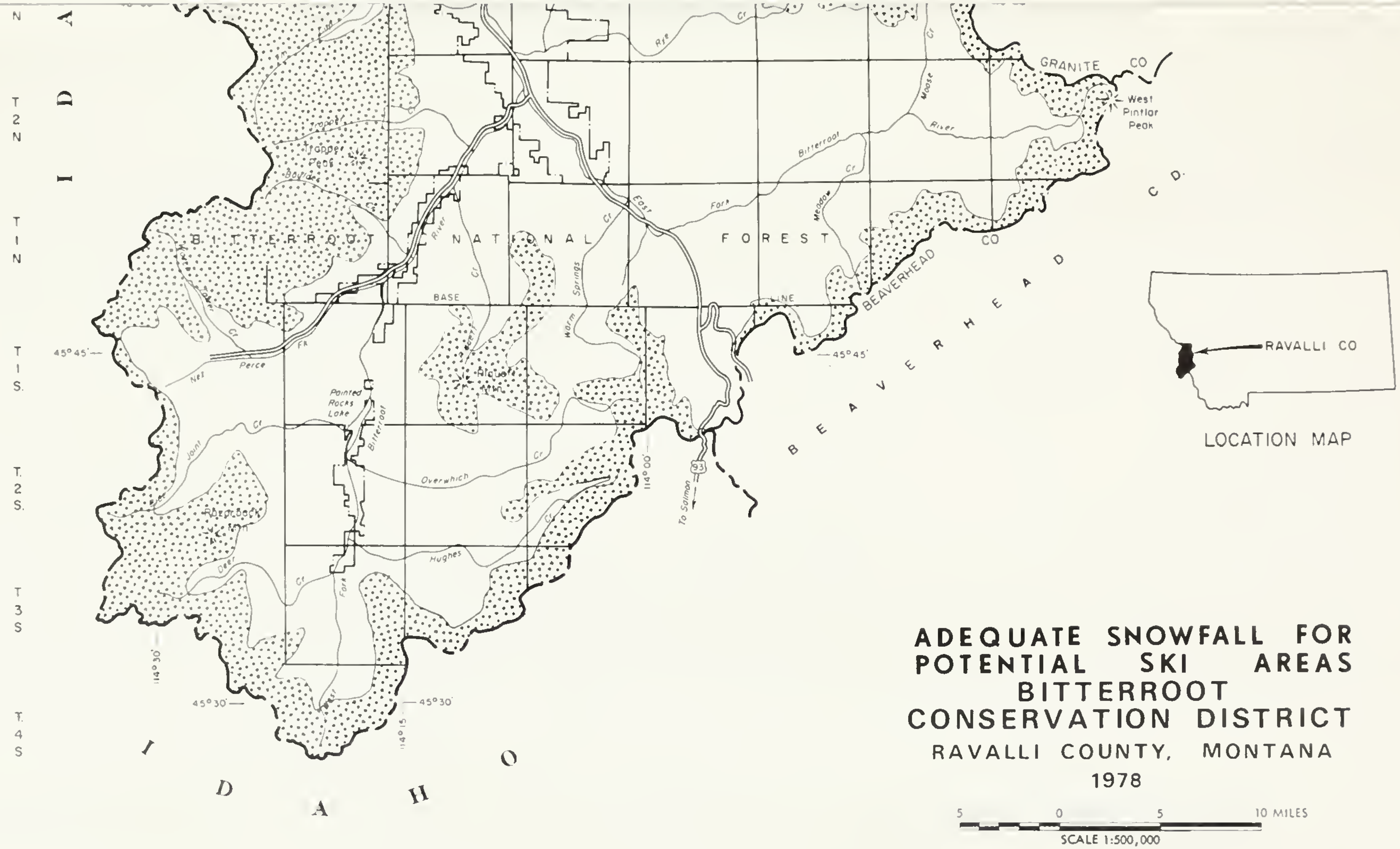
USDA SCS-PORTLAND OR 1979

M7-EN-23991-7



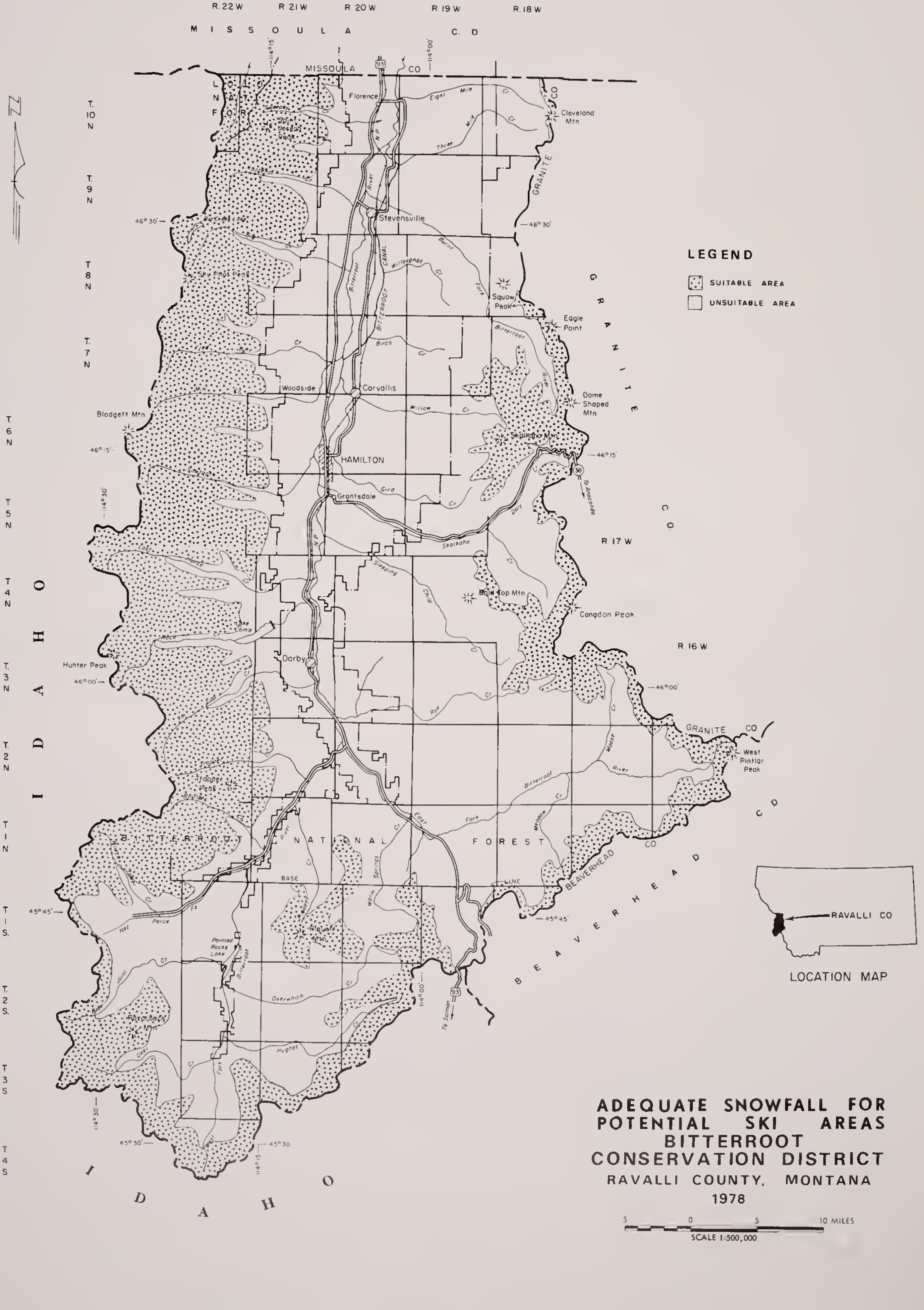
ADEQUATE SNOWFALL FOR POTENTIAL SKI AREAS
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

M7-EN-23991-13



ADEQUATE SNOWFALL FOR POTENTIAL SKI AREAS
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

M7-EN-23991-13



ADEQUATE SNOWFALL FOR POTENTIAL SKI AREAS
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE USDA SCS-PORTLAND OR 1979

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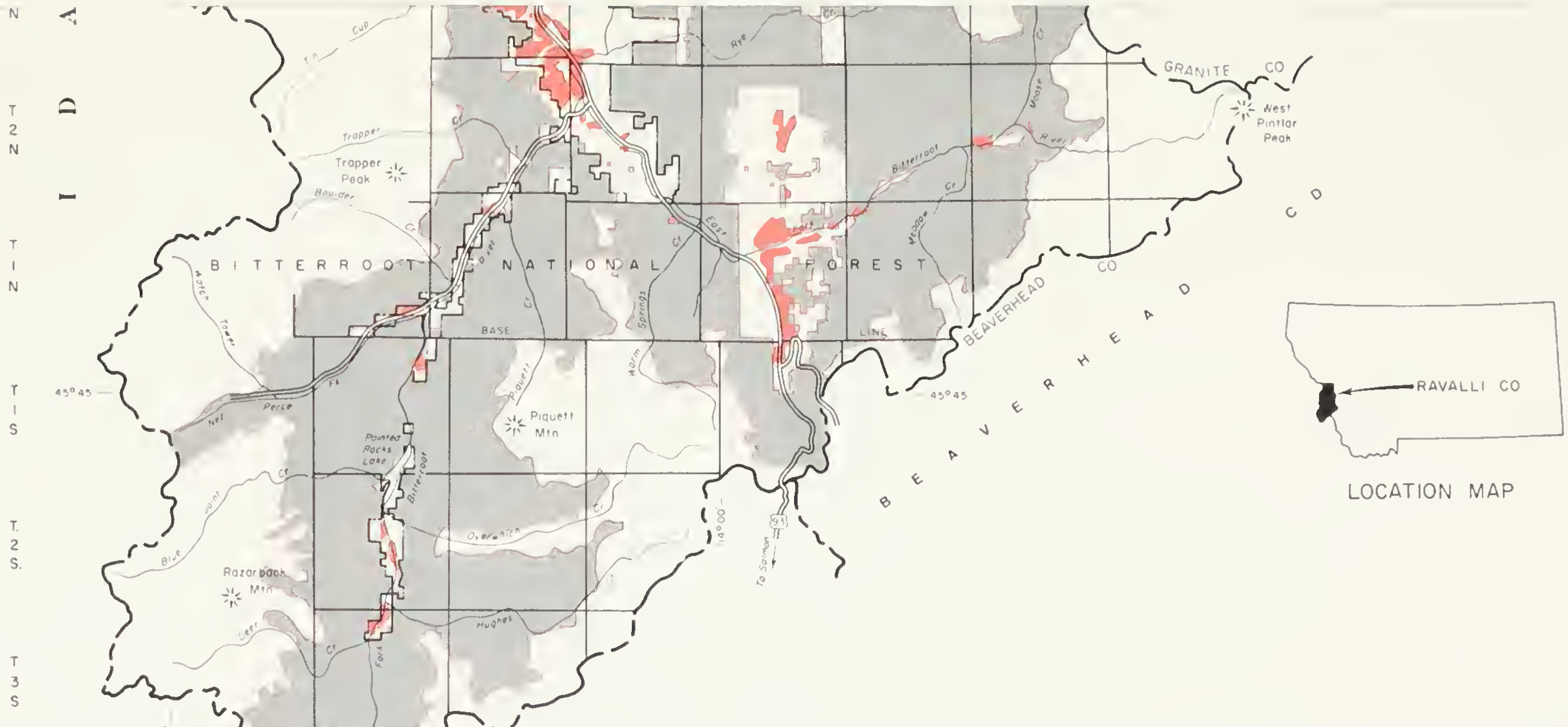

LAND USE
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

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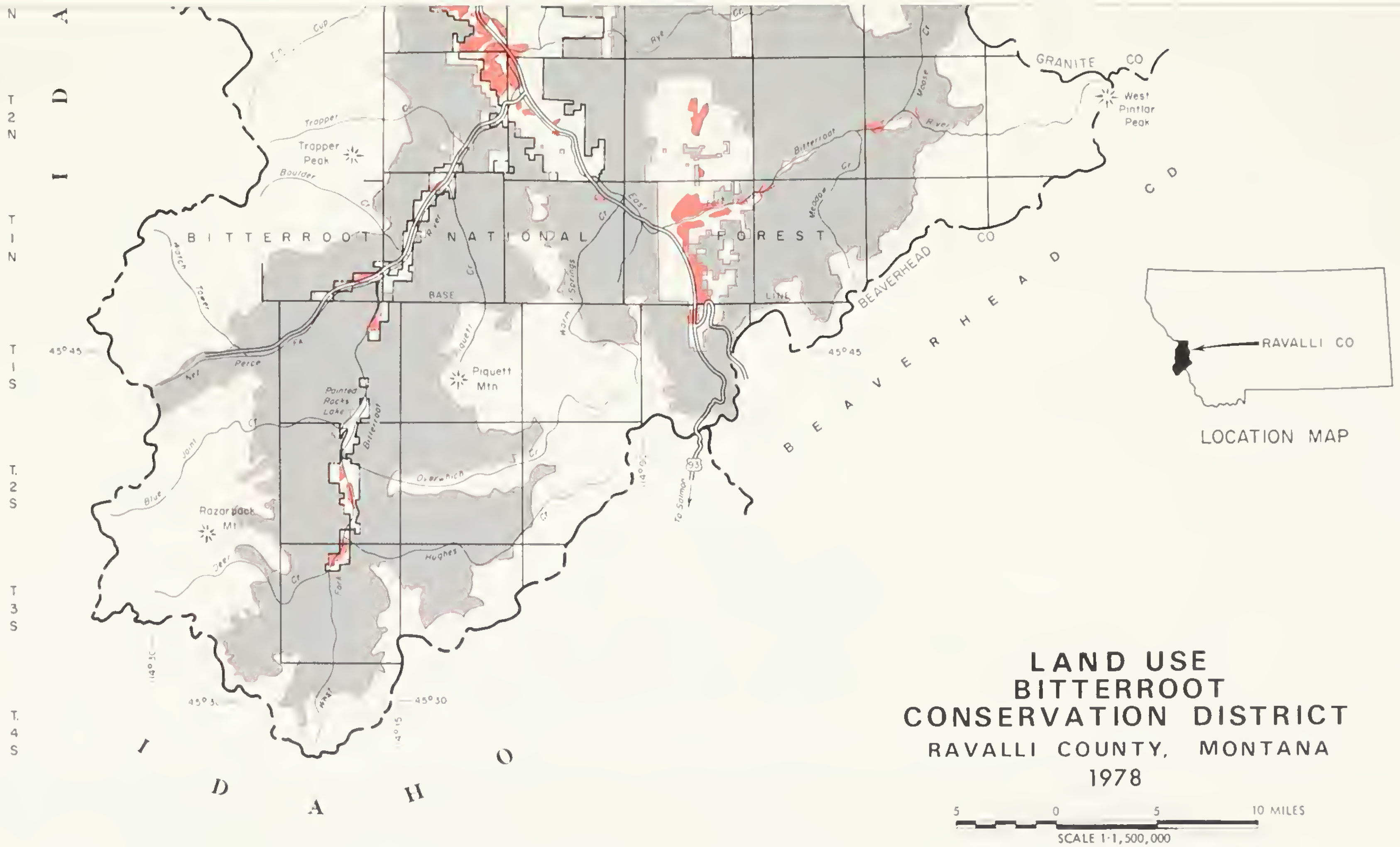
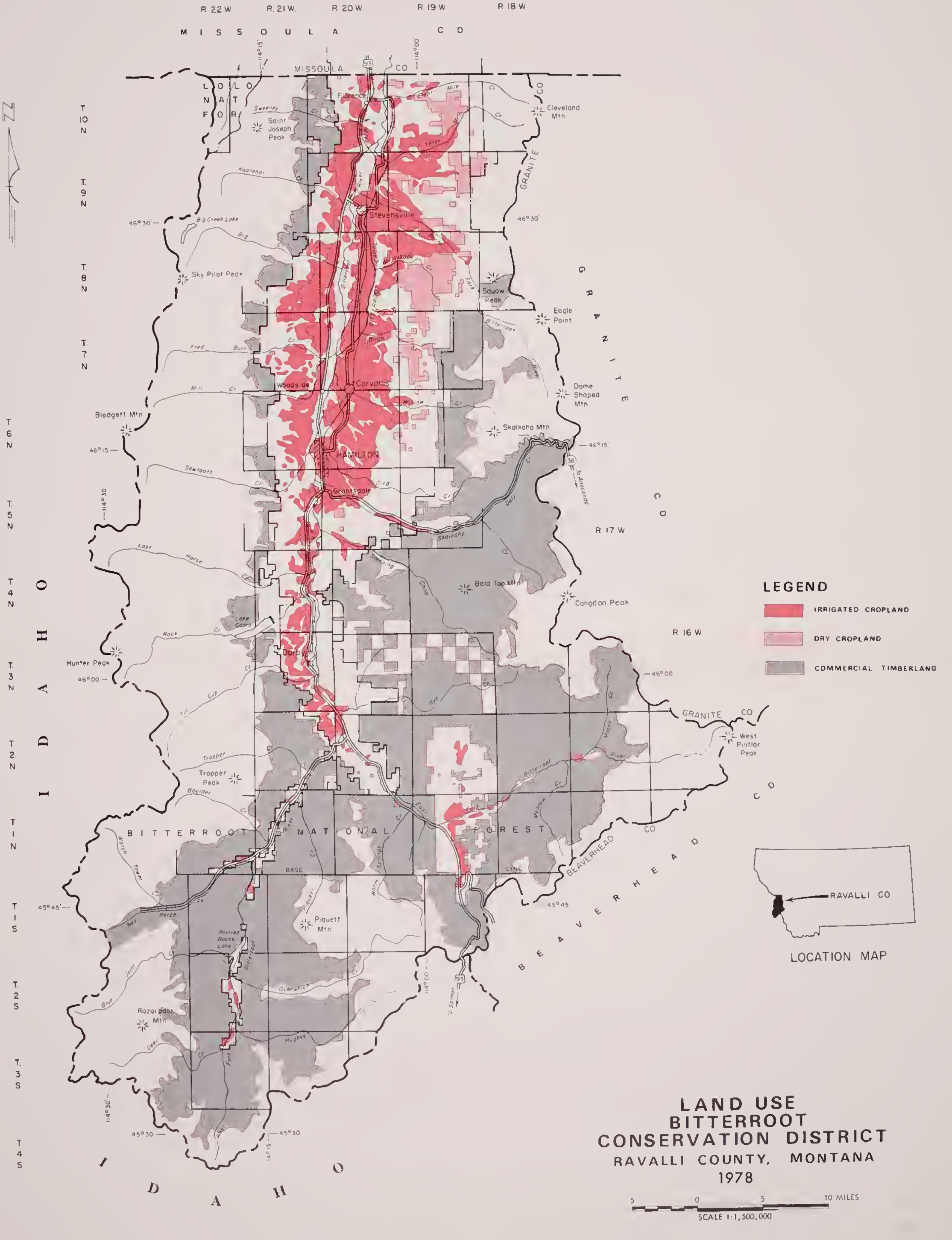
SCALE 1:1,500,000



LAND USE
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978



LEGEND

- 🟥 IRRIGATED CROPLAND
- ▨ DRY CROPLAND
- ▨ COMMERCIAL TIMBERLAND

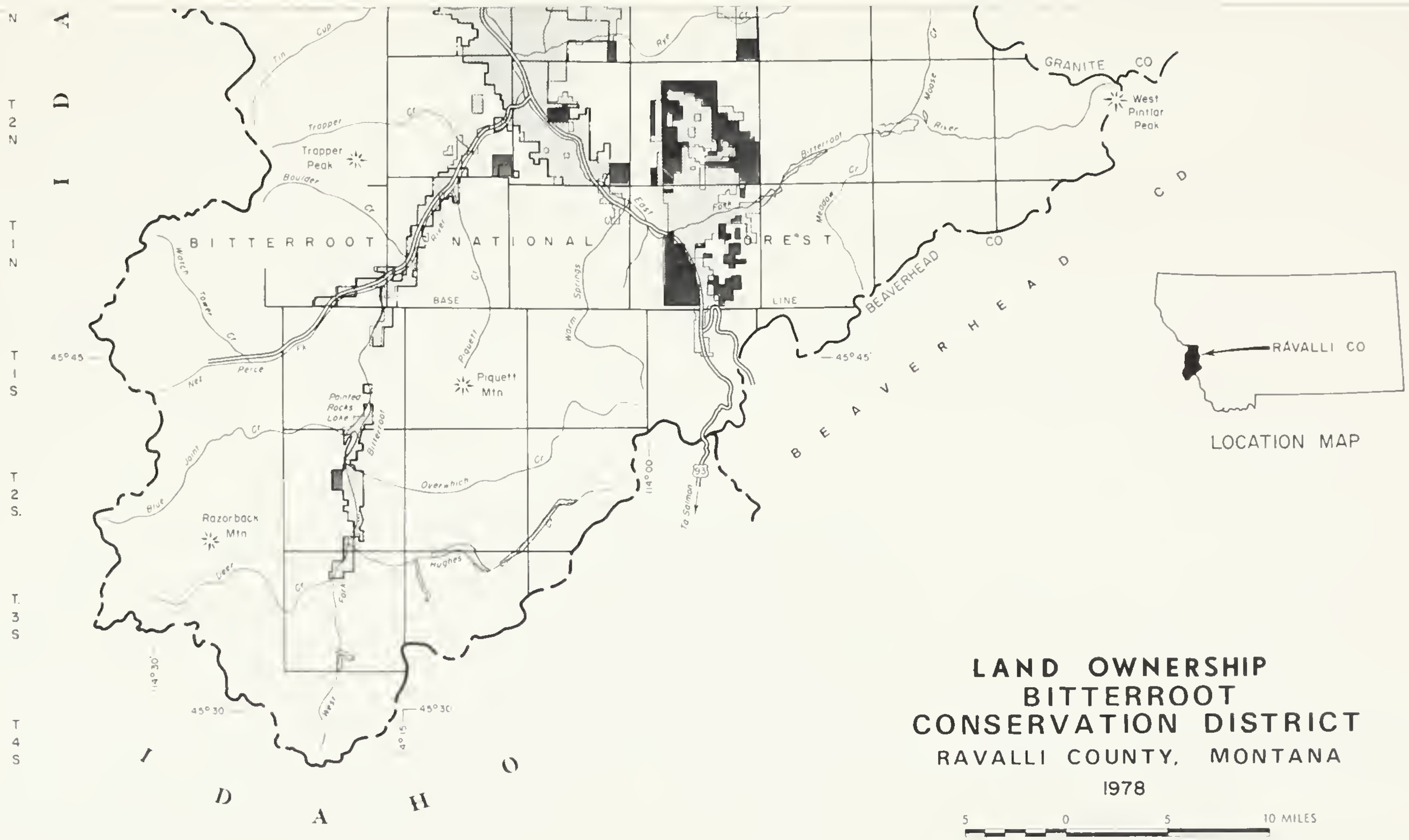
LAND USE
BITTERROOT
CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

5 0 5 10 MILES

SCALE 1:1,500,000

Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.

U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE USDA SCS PORTLAND OR 1979



LAND OWNERSHIP
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

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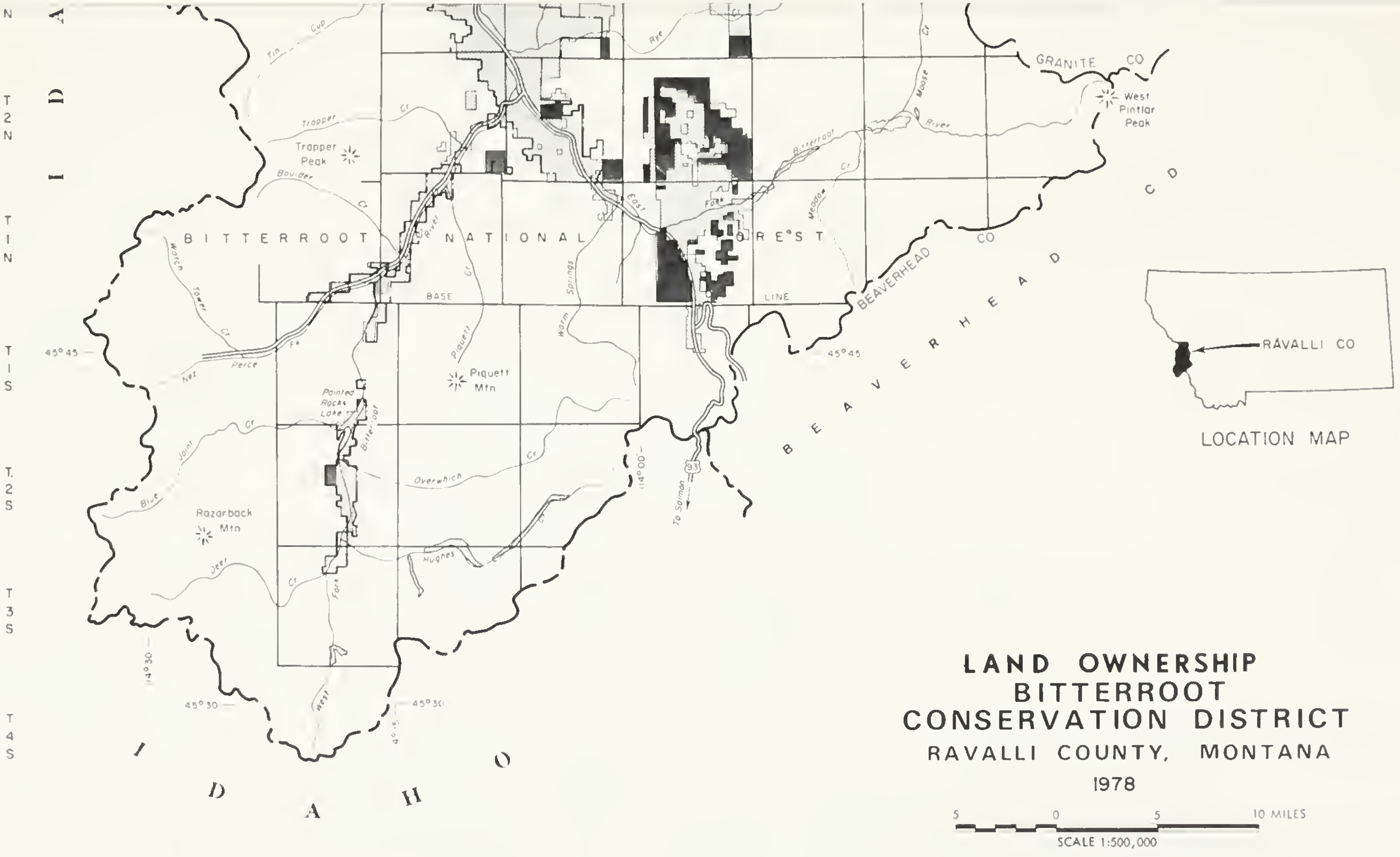
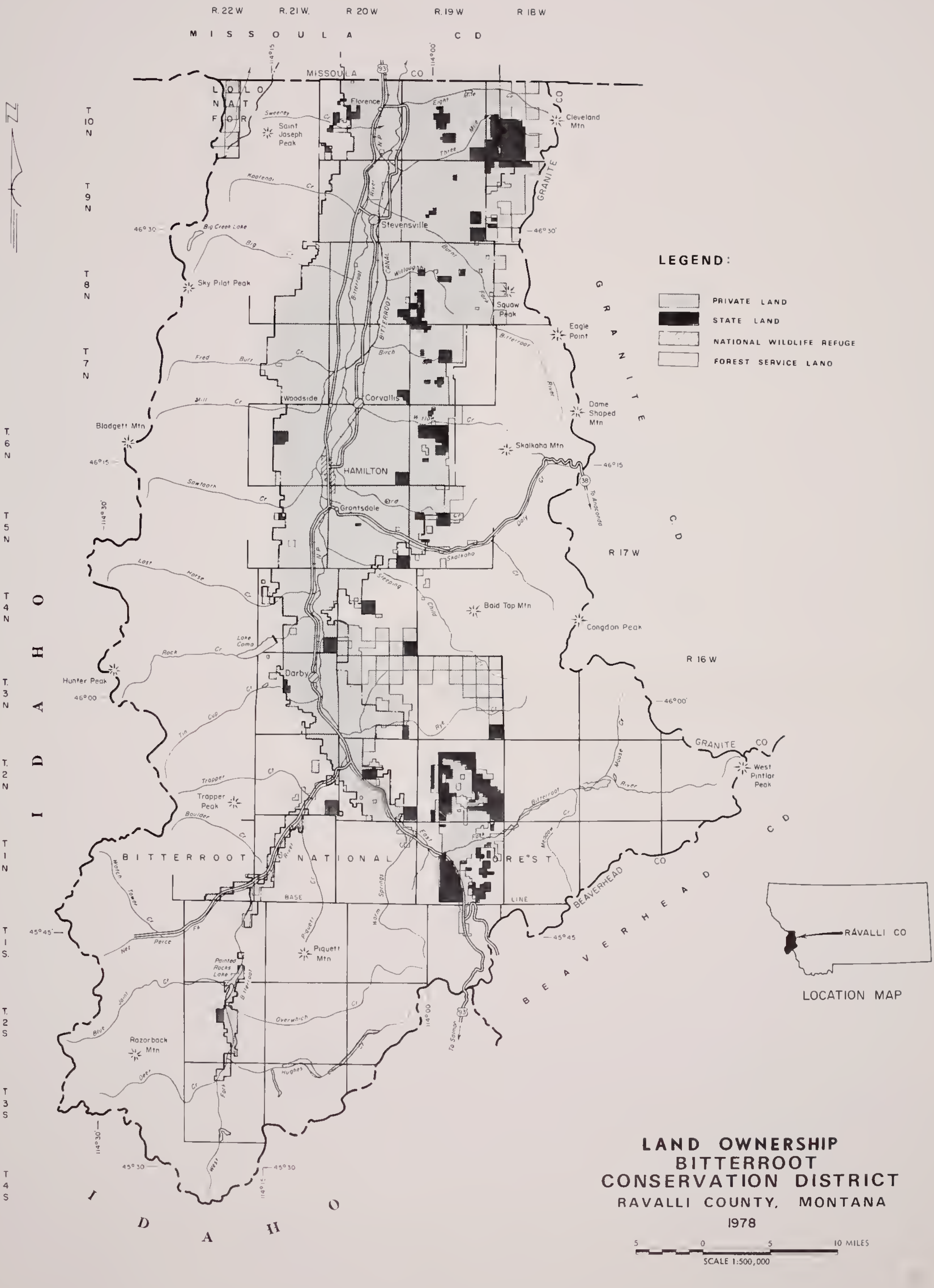
SCALE 1:500,000



LAND OWNERSHIP
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA

1978

LAND OWNERSHIP
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978



Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

USDA SCS PORTLAND OR 1979

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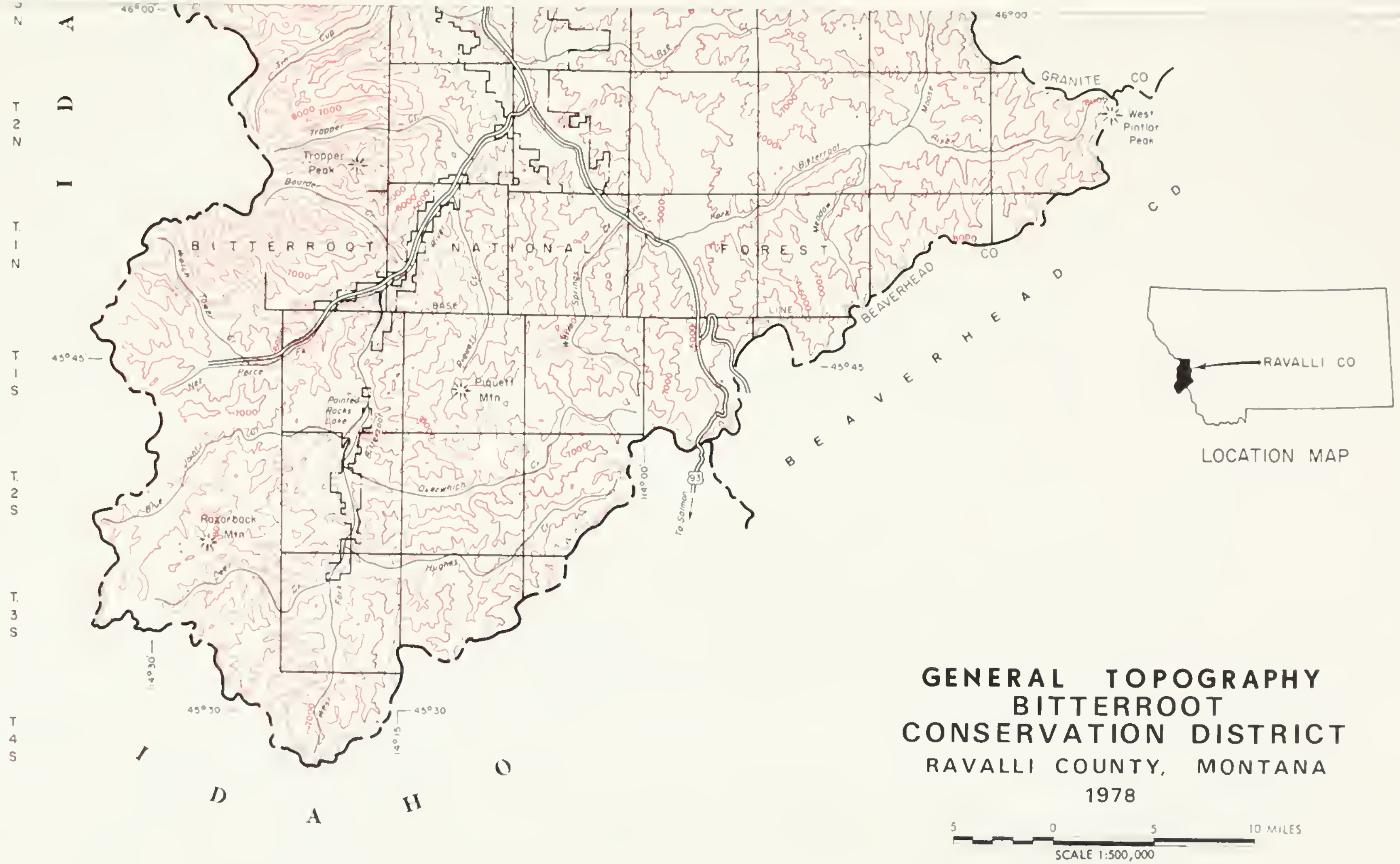
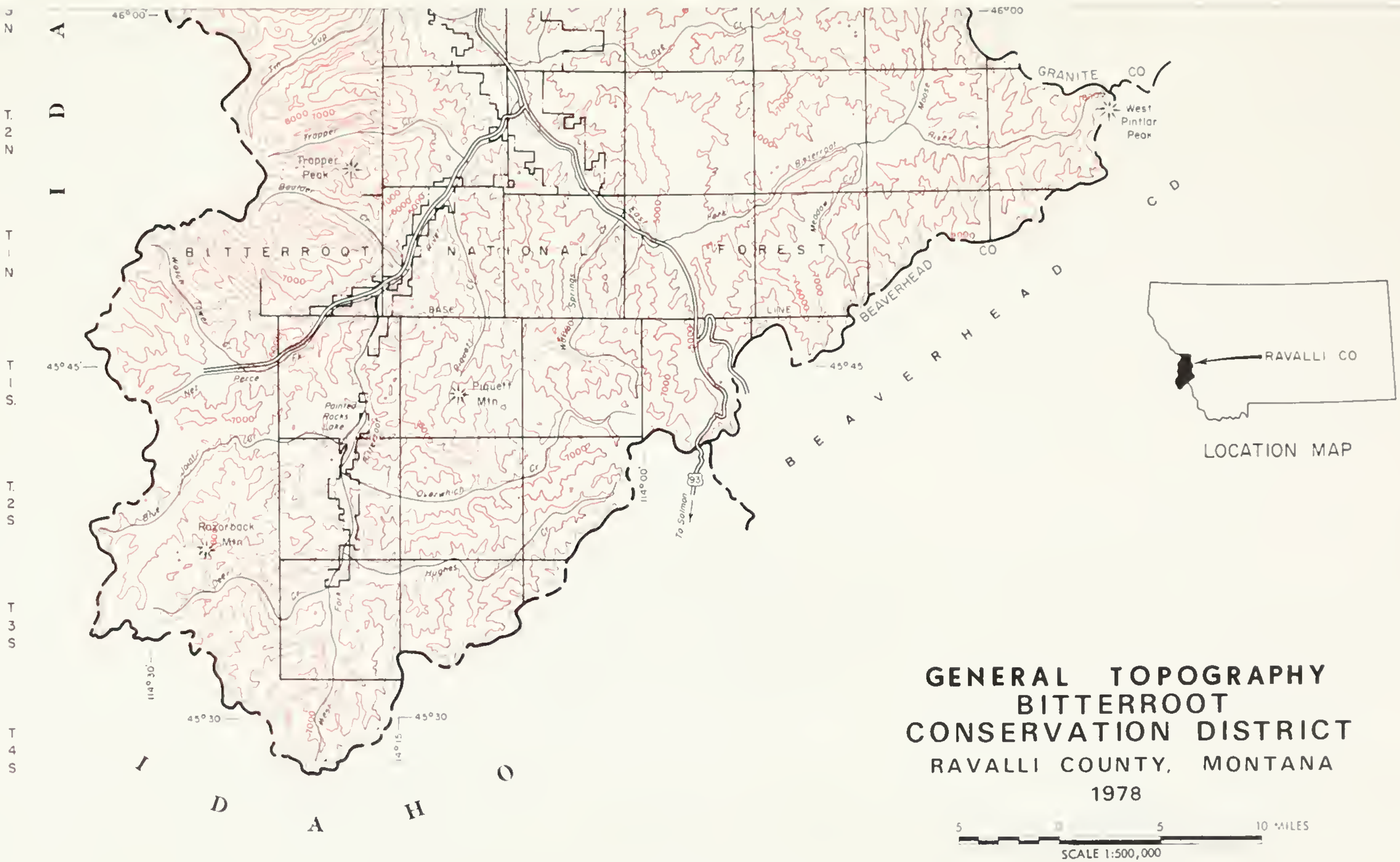


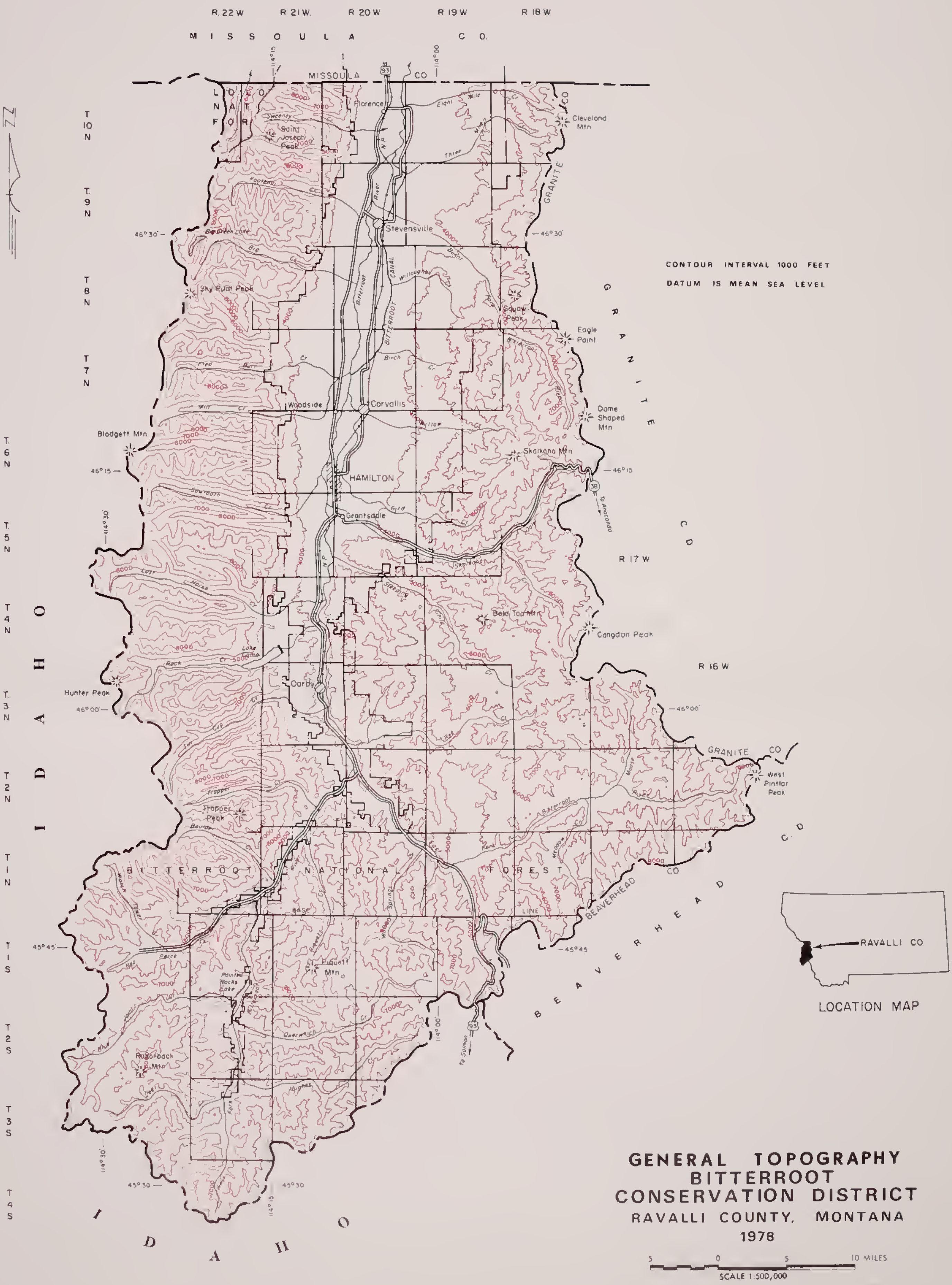
GENERAL TOPOGRAPHY
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

M7-EN-23991-5



GENERAL TOPOGRAPHY
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

M7-EN-23991-5

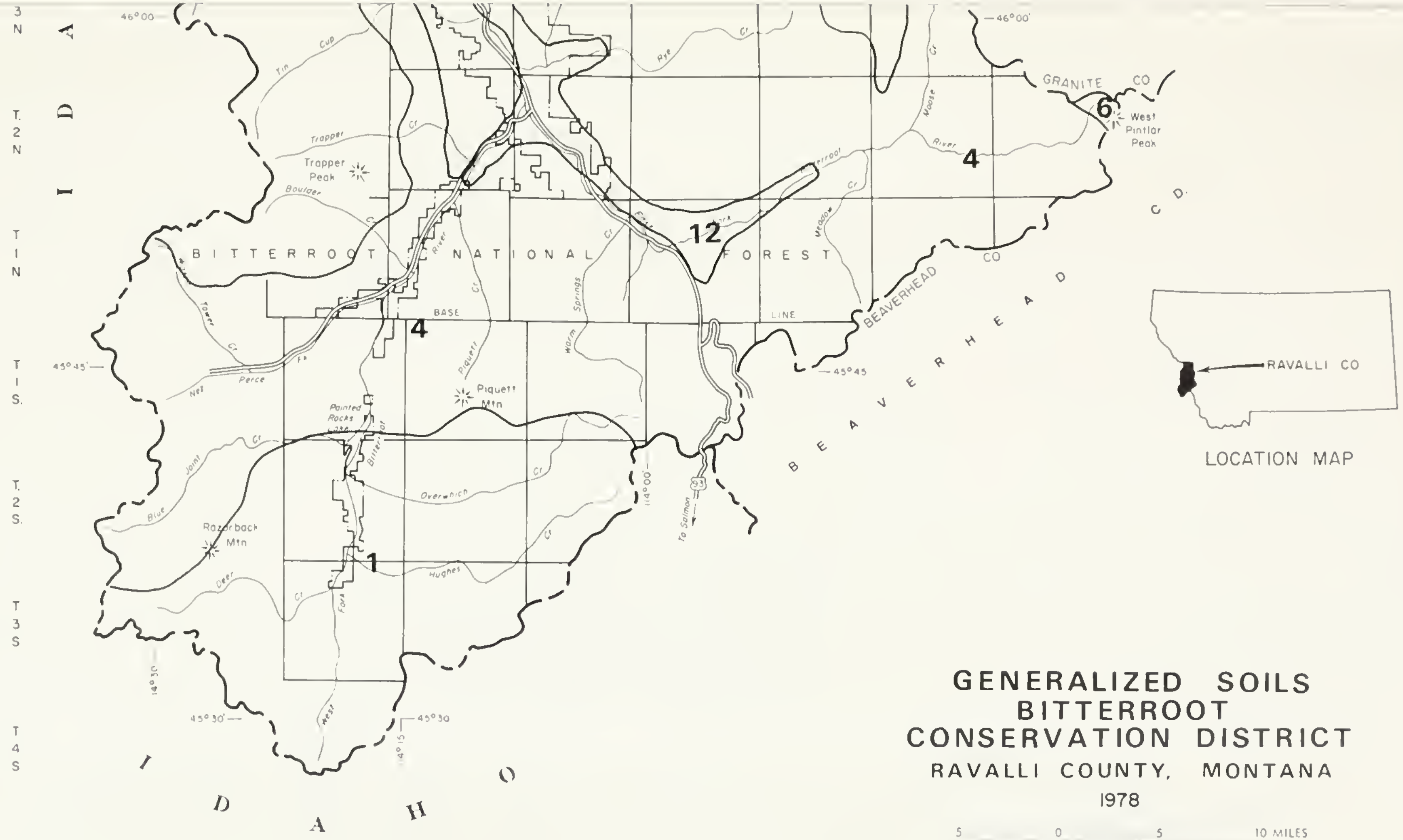


CONTOUR INTERVAL 1000 FEET

DATUM IS MEAN SEA LEVEL

GENERAL TOPOGRAPHY
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

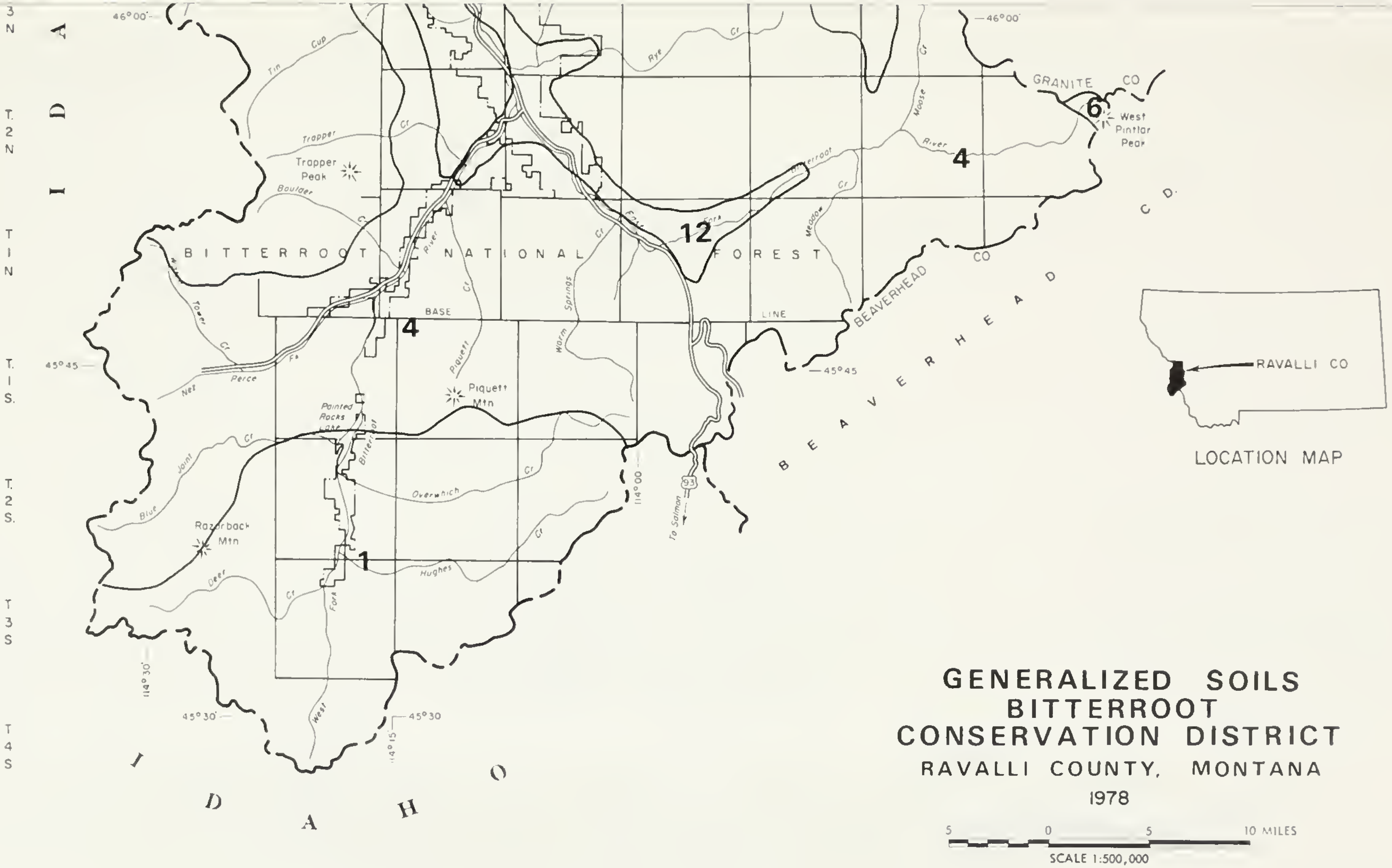
Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE USDA SCS-PORTLAND OR 1979



GENERALIZED SOILS
BITTERROOT
CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA

1978

M7-EN-23991-1



GENERALIZED SOILS
BITTERROOT CONSERVATION DISTRICT

RAVALLI COUNTY, MONTANA

1978

M7-EN-23991-1

LEGEND

SOILS OF THE MOUNTAINS

1 Moderately steep to very steep shallow to deep well drained soils over argillite or quartzite bedrock on the mountains

2 Steep to very steep, shallow to deep, well-drained soils over calcareous rock on the mountains

3 Moderately steep to very steep, shallow to deep, well-drained soils over argillite or granite bedrock on the mountains

4 Moderately steep to very steep, shallow to deep well-drained soils over granite bedrock on the mountains

5 Steep and very steep shallow to deep well-drained soils over granite gneiss and schist rock outcrops are on tops and sides of the high frost churned partly glaciated mountains

6 Steep and very steep shallow to deep well-drained soils over calcareous rock extensive areas of rock outcrops are on top and sides of high glacial scoured mountains

SOILS OF THE HIGH TERRACES & MOUNTAIN FOOTHILLS

7 Moderately sloping to steep shallow to deep well-drained soils formed in gravelly alluvium or over argillite or sandstone bedrock on rolling hills, benches and terraces

8 Sloping to steep shallow to deep well-drained soils formed in calcareous alluvium or over calcareous bedrock on rolling hills benches and terraces

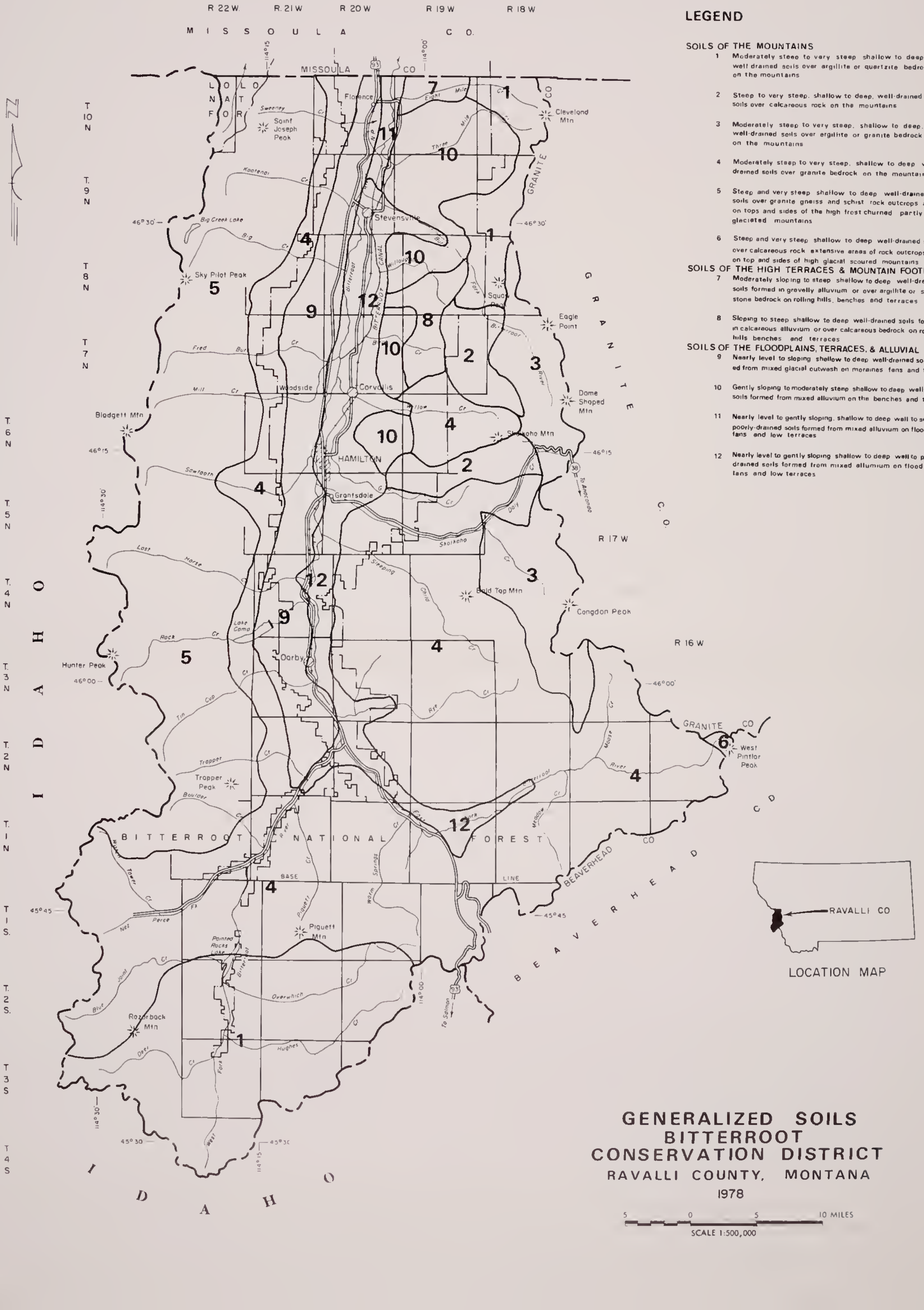
SOILS OF THE FLOOOPLAINS, TERRACES, & ALLUVIAL FANS

9 Nearly level to sloping shallow to deep well-drained soils formed from mixed glacial outwash on moraines fans and terraces

10 Gently sloping to moderately steep shallow to deep well-drained soils formed from mixed alluvium on the benches and terraces

11 Nearly level to gently sloping, shallow to deep well to somewhat poorly-drained soils formed from mixed alluvium on flood plains fans and low terraces

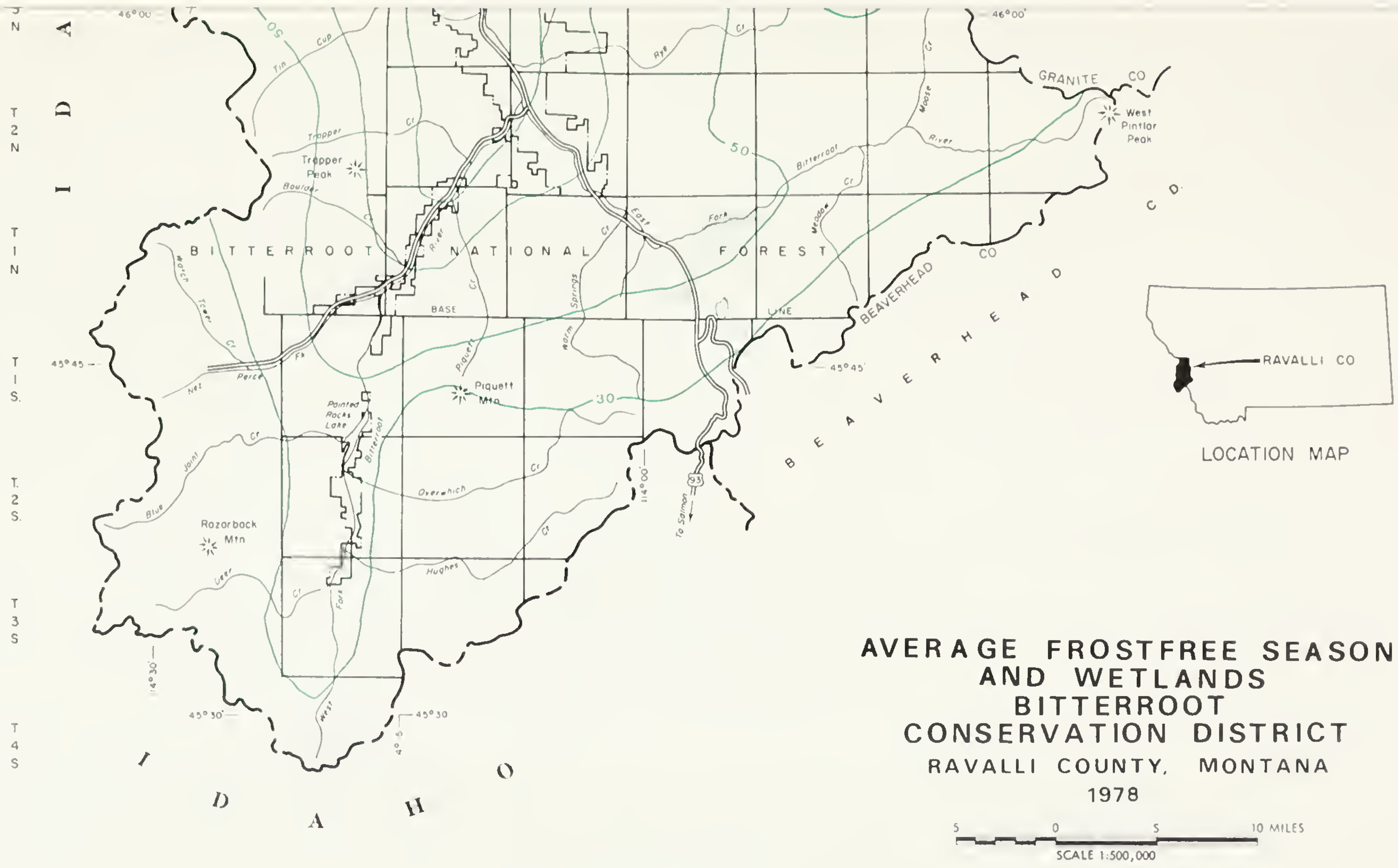
12 Nearly level to gently sloping shallow to deep well to poorly-drained soils formed from mixed allumium on flood plains fans and low terraces



GENERALIZED SOILS
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
US DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE USDA SCS-PORTLAND OR 1979

M7-EN-23991-1

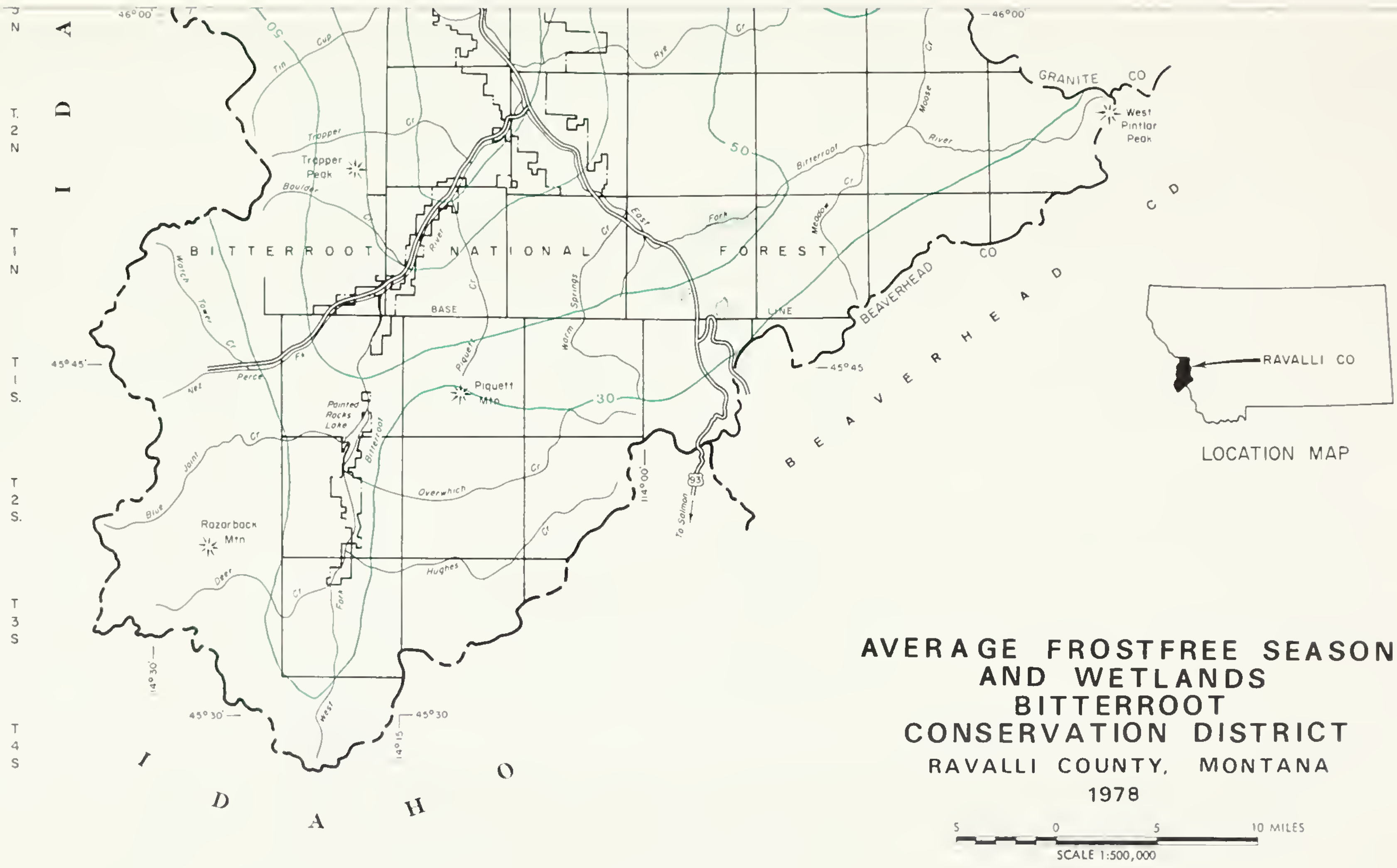


AVERAGE FROSTFREE SEASON AND WETLANDS
BITTERROOT CONSERVATION DISTRICT

RAVALLI COUNTY, MONTANA

1978

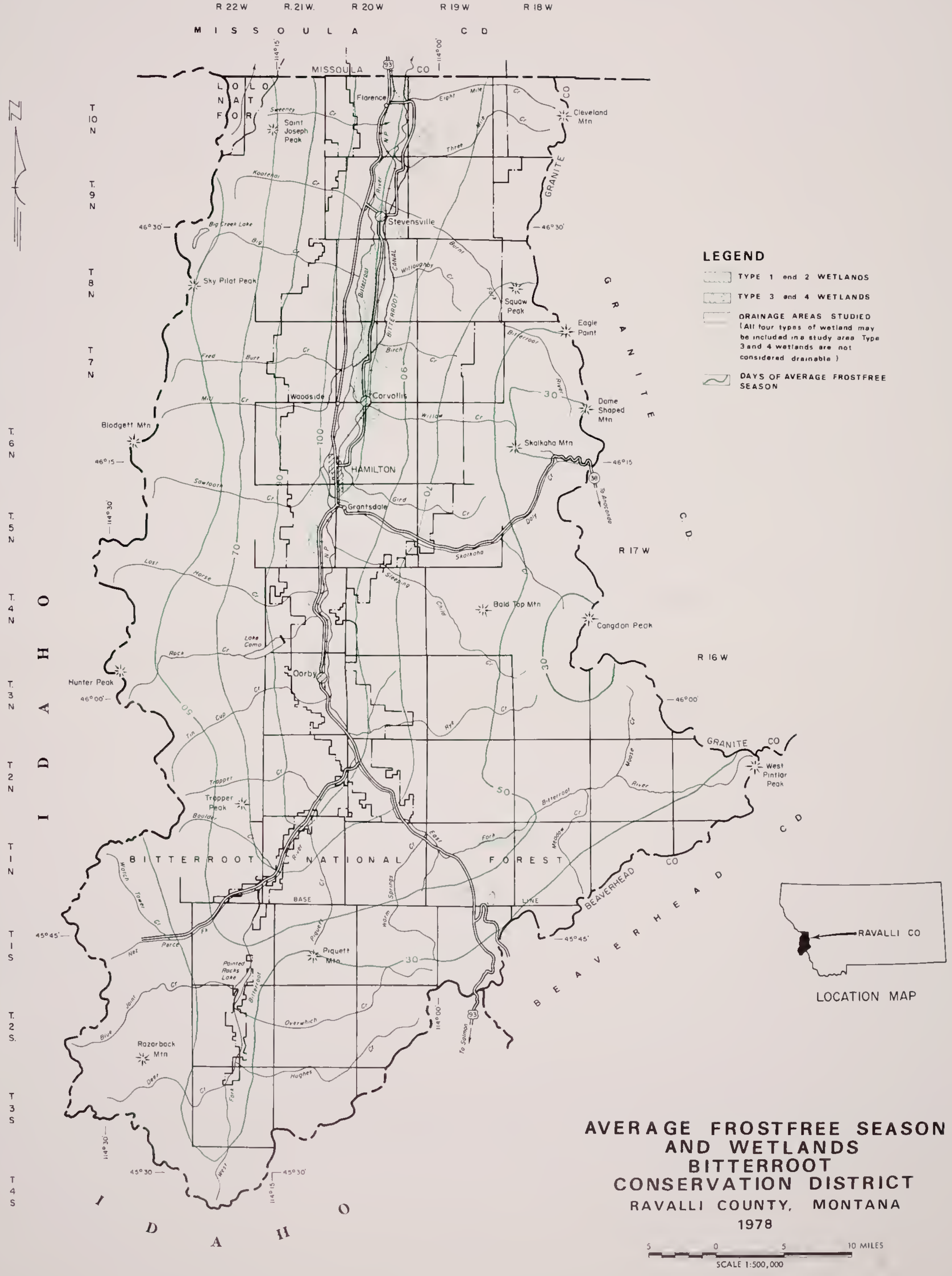
M7-EN-23991-15



AVERAGE FROSTFREE SEASON AND WETLANDS
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

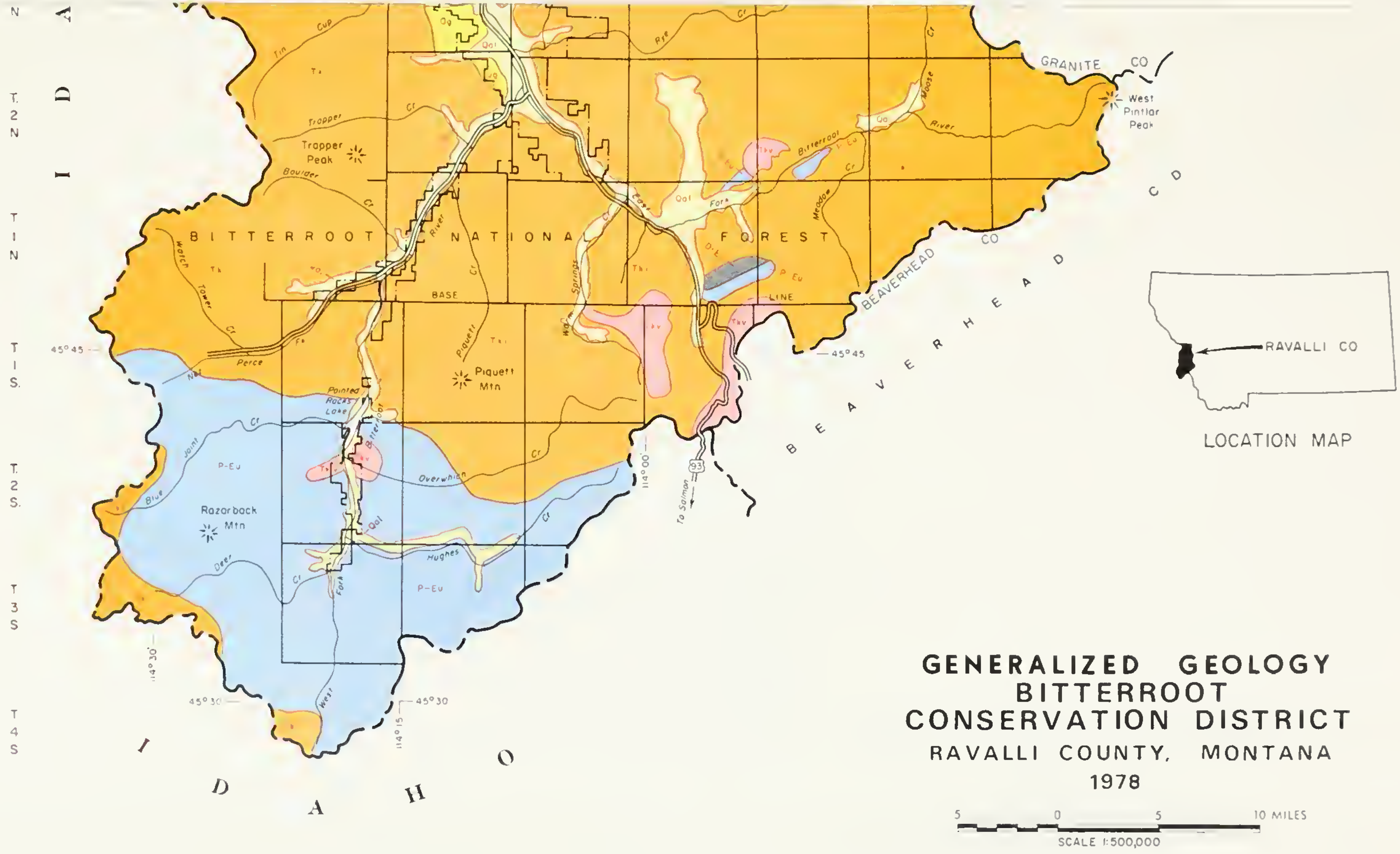
M7-EN-23991-15

AVERAGE FROSTFREE SEASON AND WETLANDS
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978



Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE USDA-SCS-PORTLAND OR 1979

M7-EN-23991-15



GENERALIZED GEOLOGY
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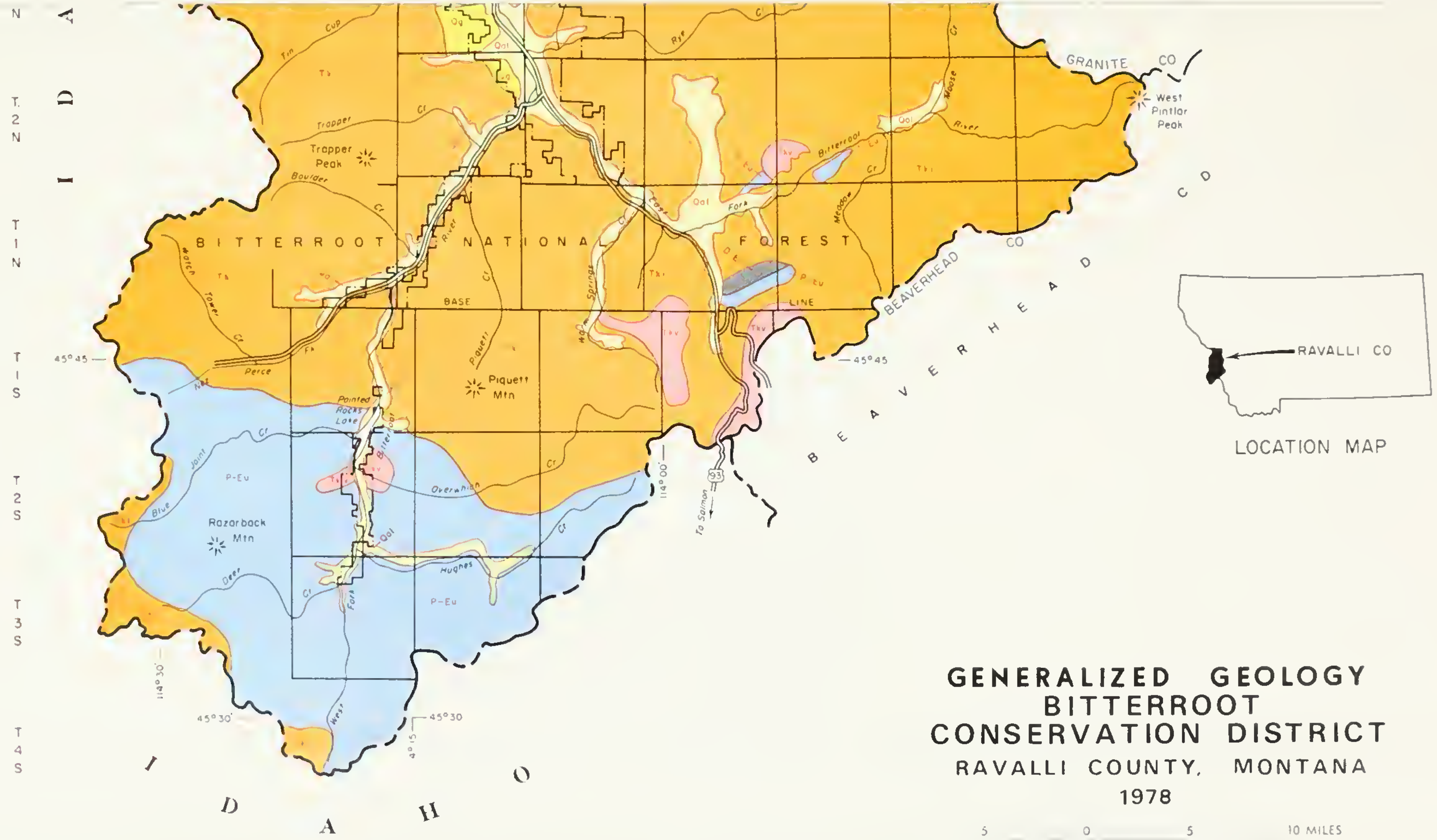
CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978



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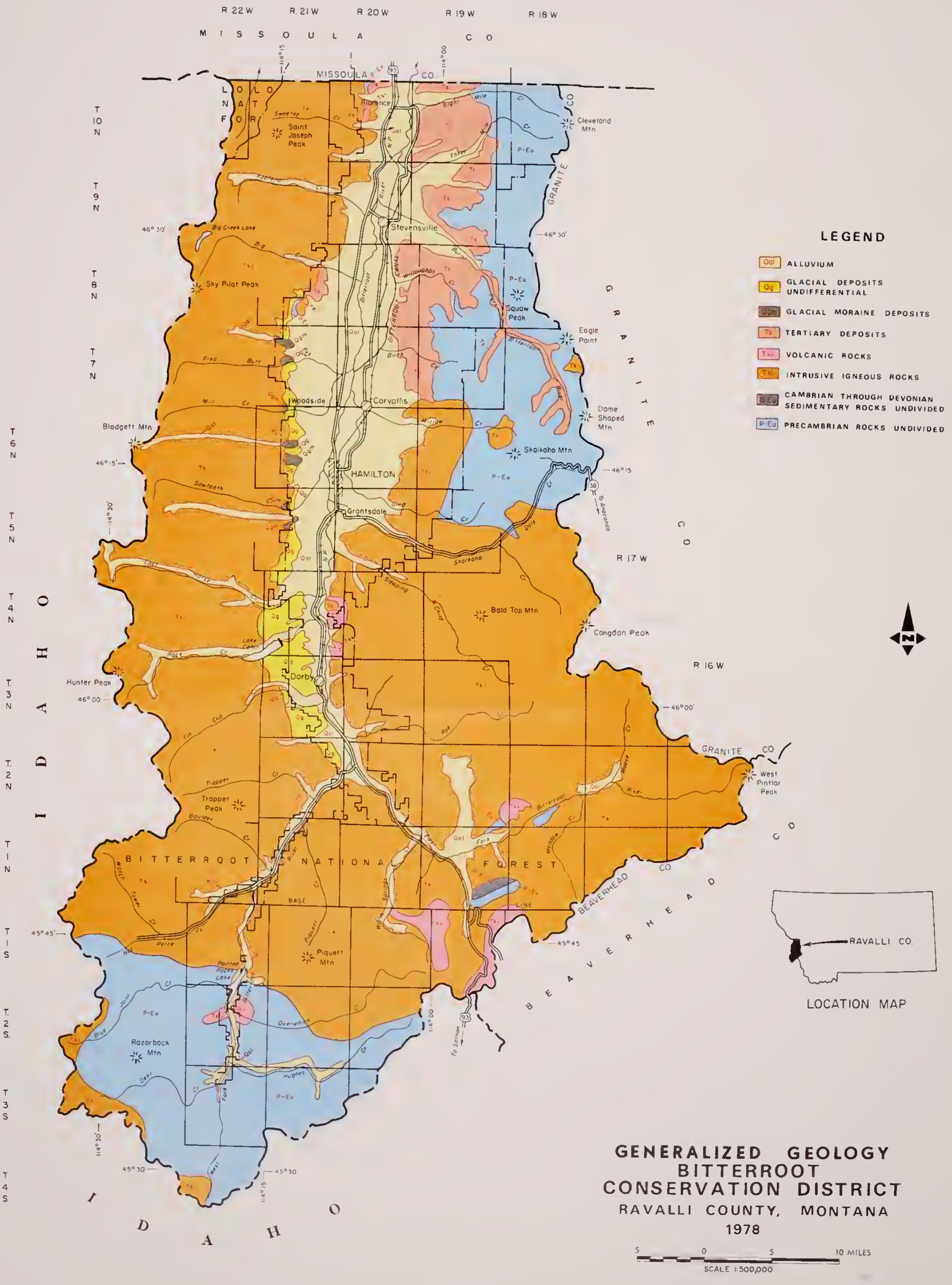
RAVALLI COUNTY, MONTANA
1978



GENERALIZED GEOLOGY
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

5 0 5 10 MILES
SCALE 1:500,000

Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

USDA SCS-PORTLAND OR 1979

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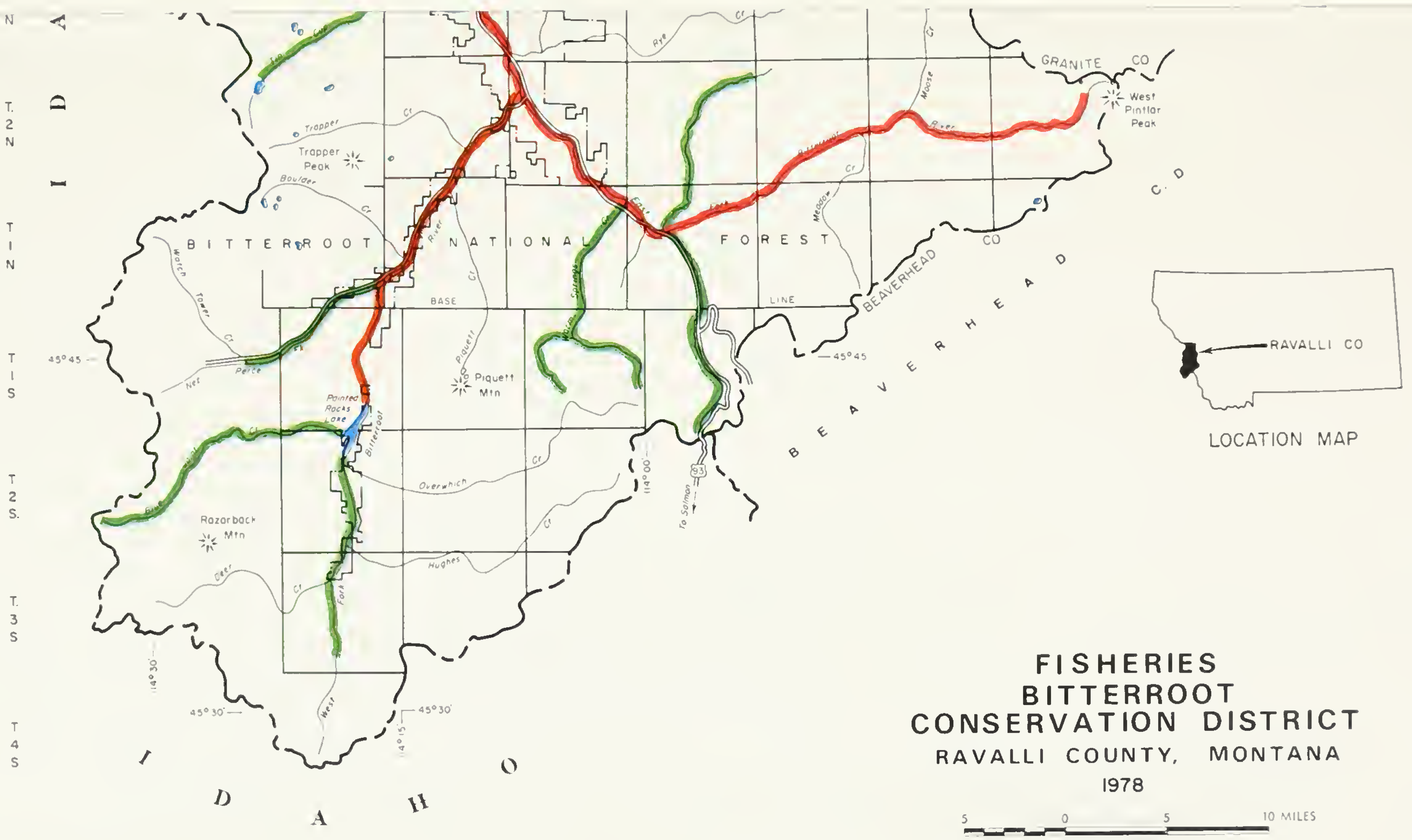
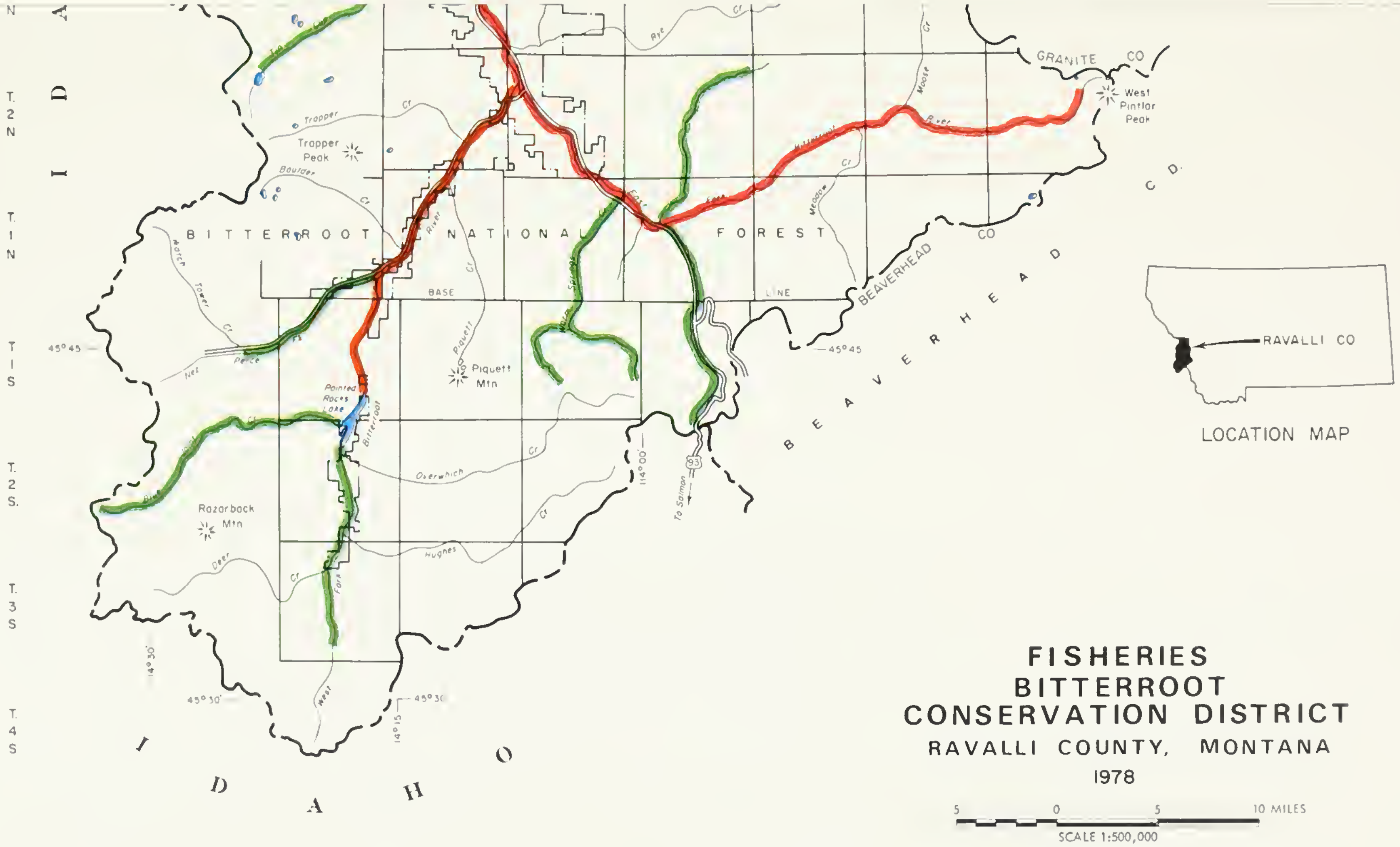


FISHERIES
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978



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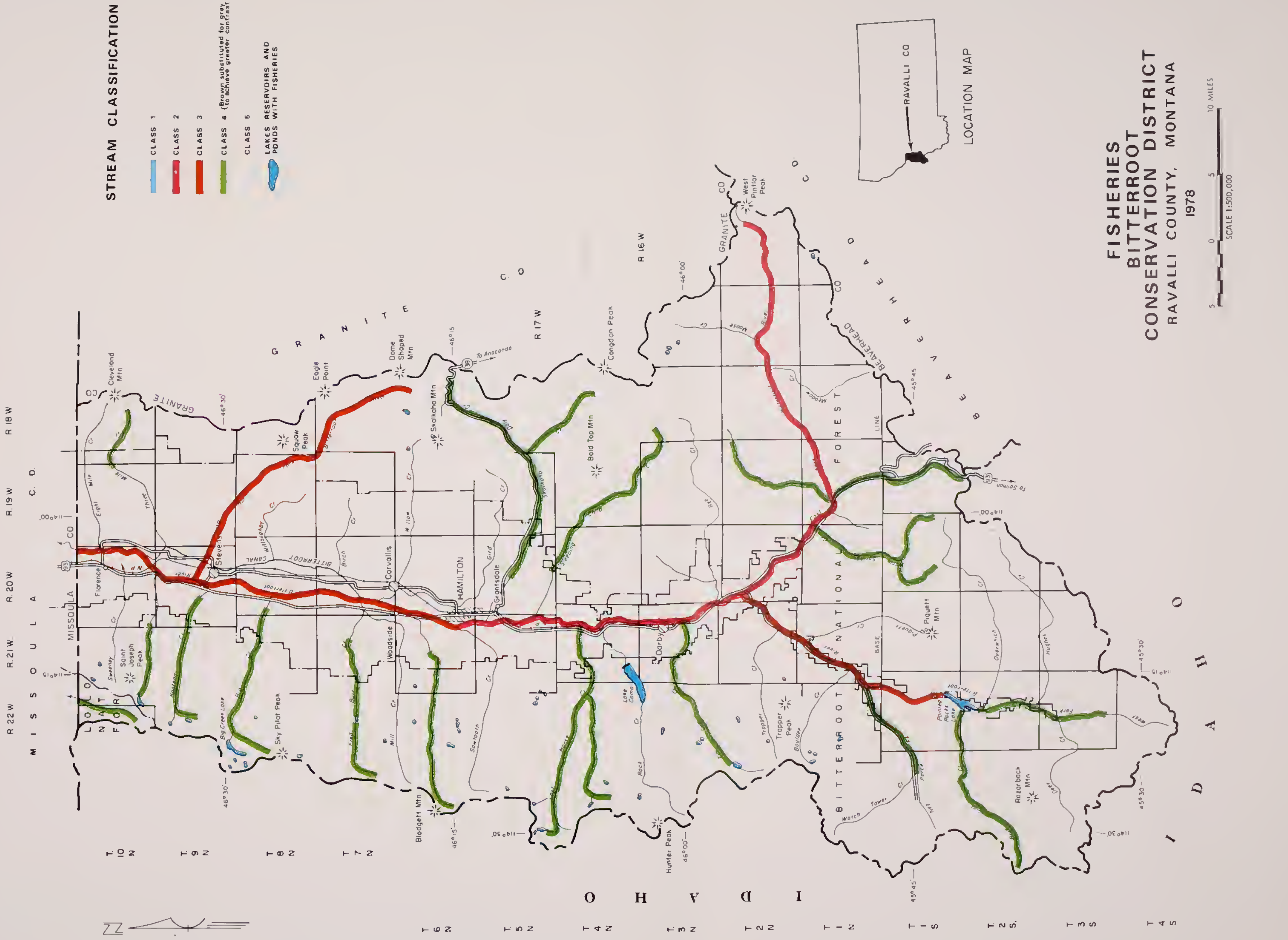
RAVALLI COUNTY, MONTANA
1978



FISHERIES
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RAVALLI COUNTY, MONTANA
1978

Source:
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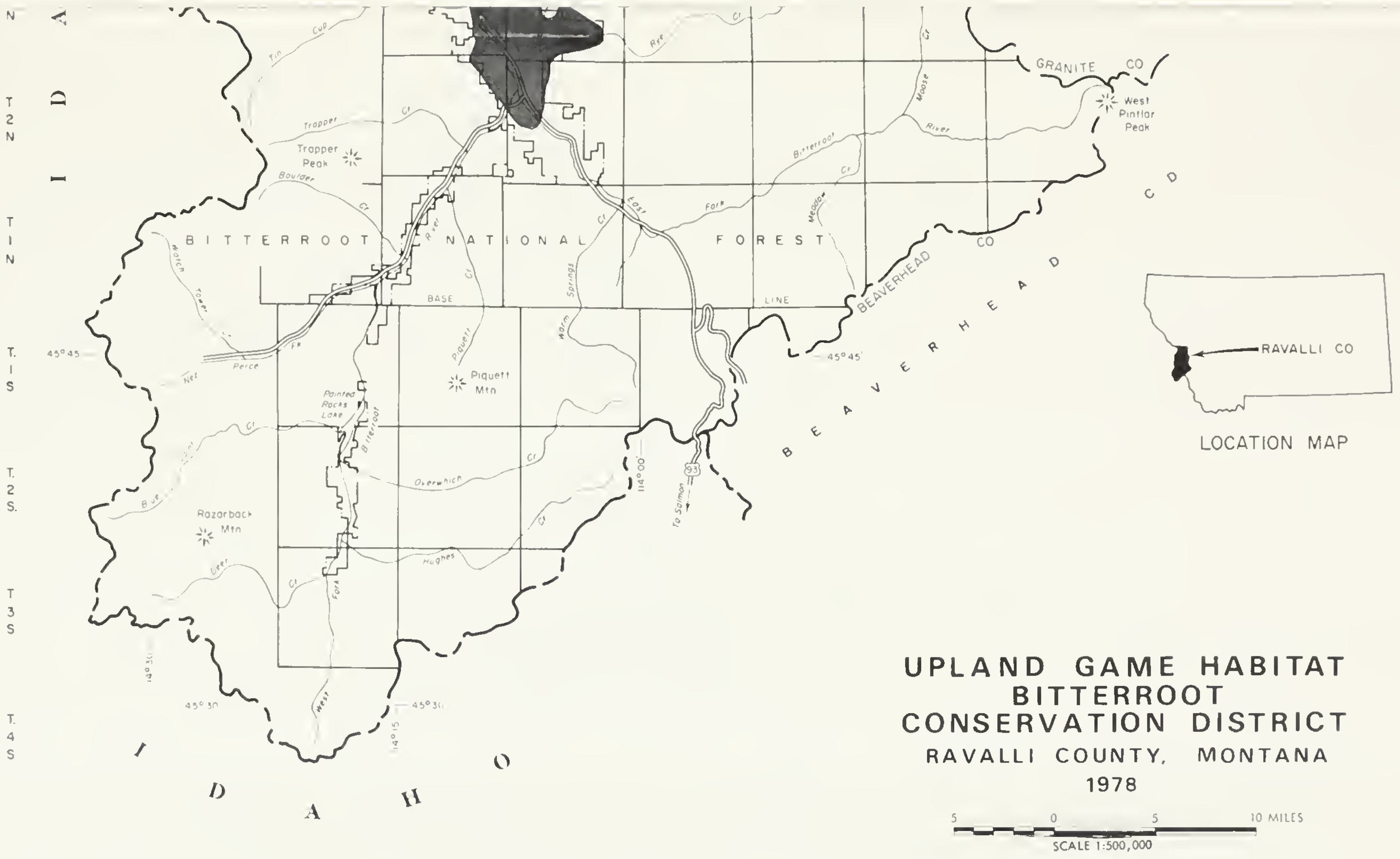
Thematic detail prepared by state staff.
U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

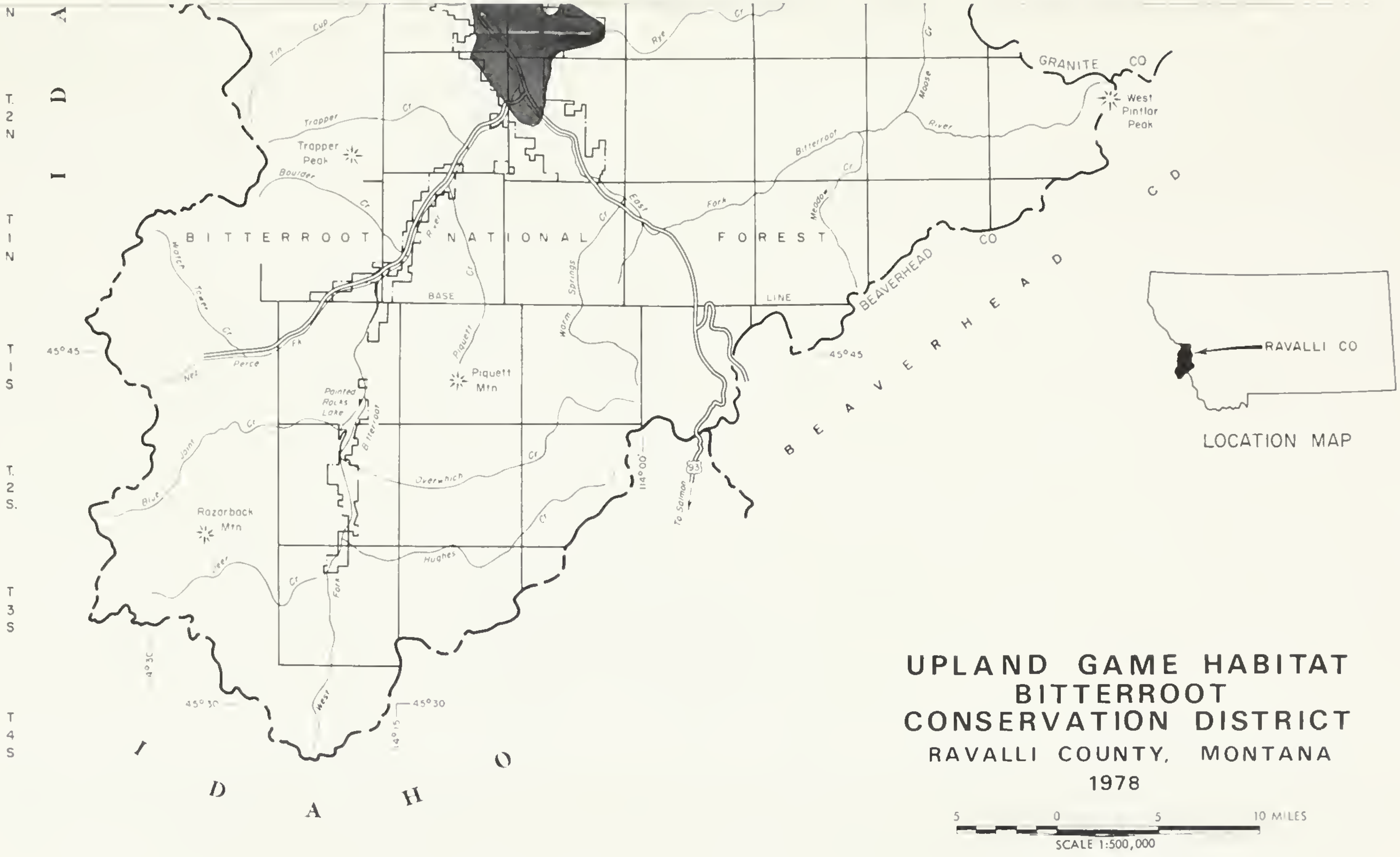
USDA SCS-PORTLAND OR 1979

M7-EN-23991-16



UPLAND GAME HABITAT
BITTERROOT CONSERVATION DISTRICT

RAVALLI COUNTY, MONTANA
1978



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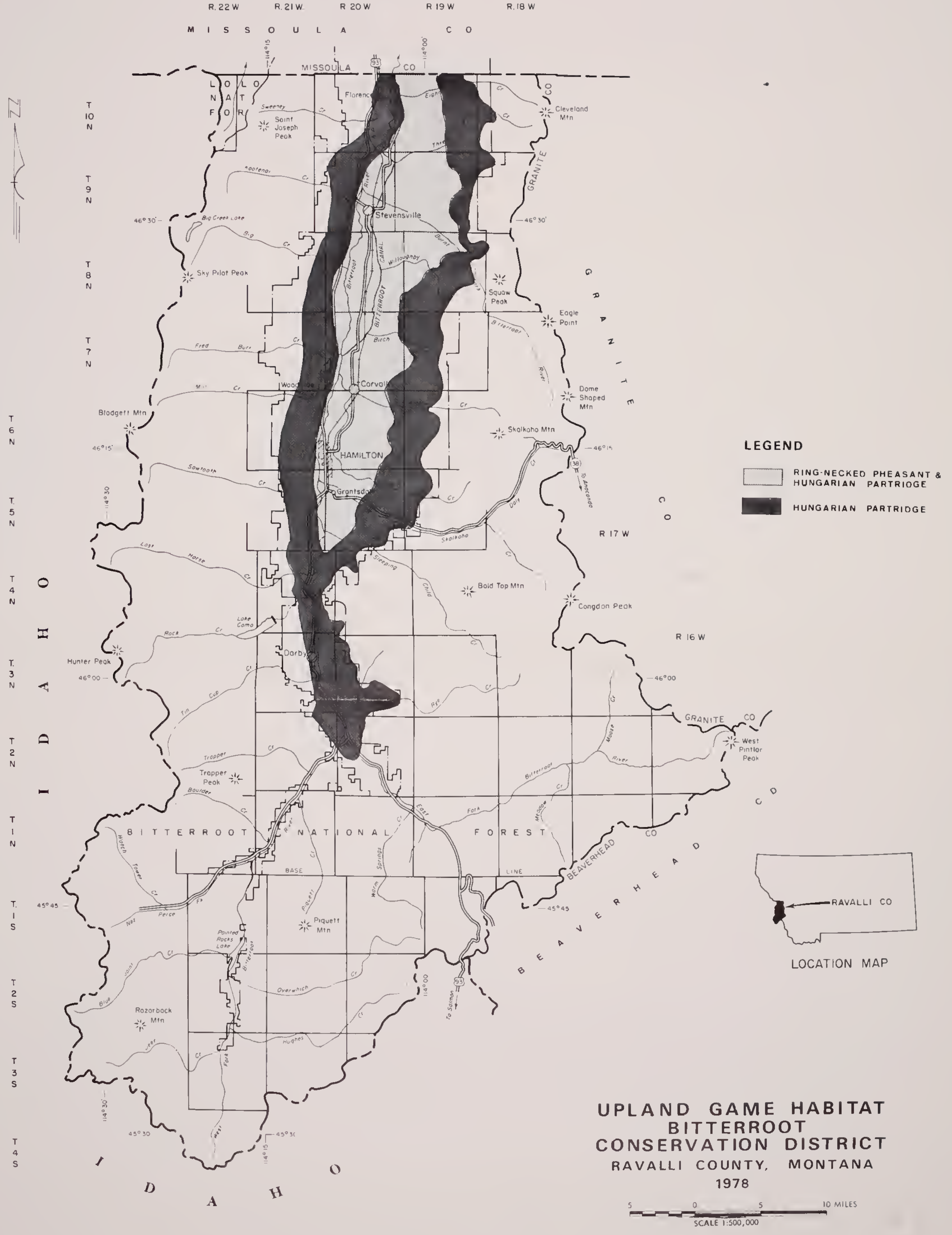
BITTERROOT
CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978



LEGEND

▭ RING-NECKED PHEASANT & HUNGARIAN PARTRIDGE

■ HUNGARIAN PARTRIDGE

RAVALLI CO

LOCATION MAP

UPLAND GAME HABITAT
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

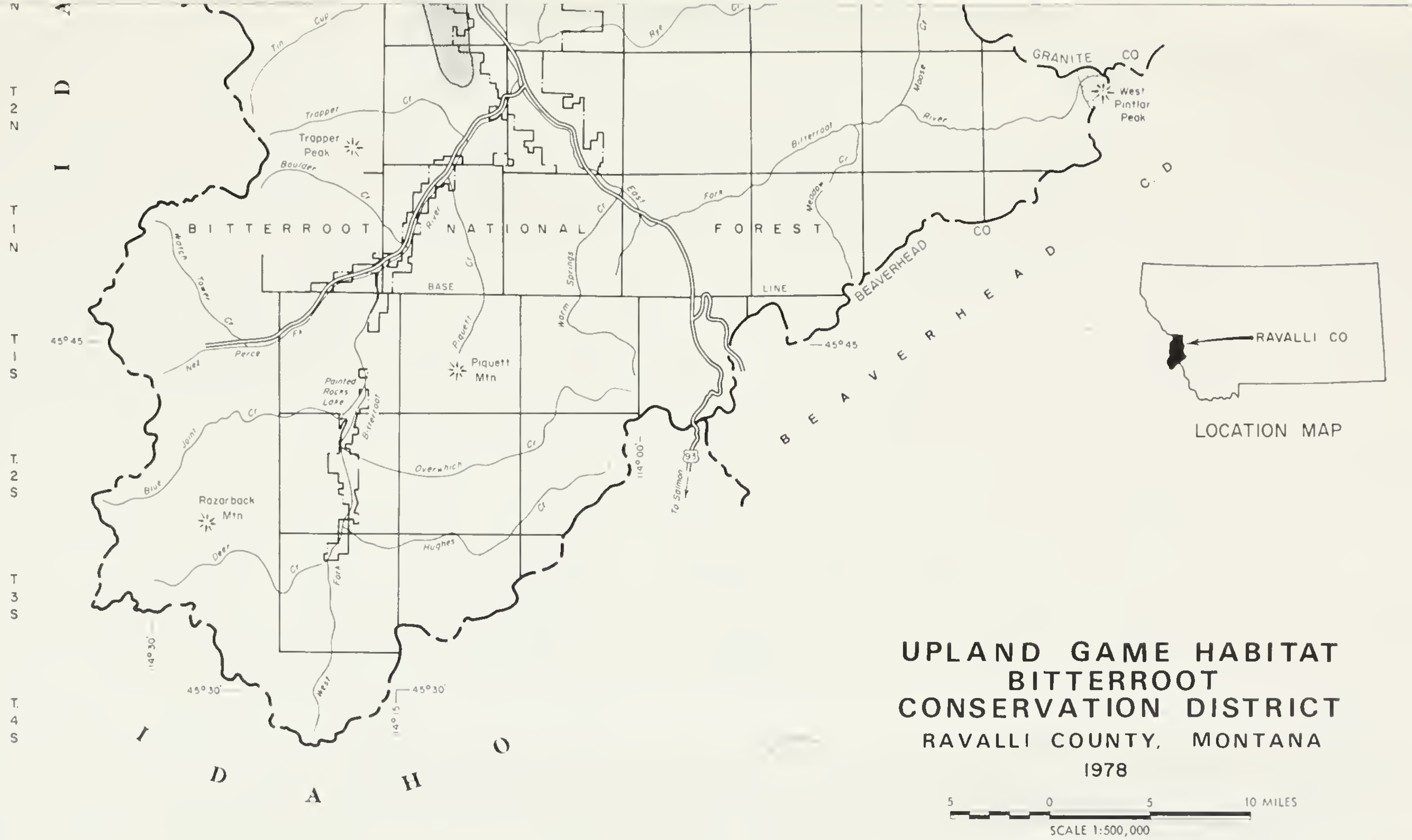
5 0 5 10 MILES

SCALE 1:500,000

Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

USDA SCS PORTLAND OR 1979

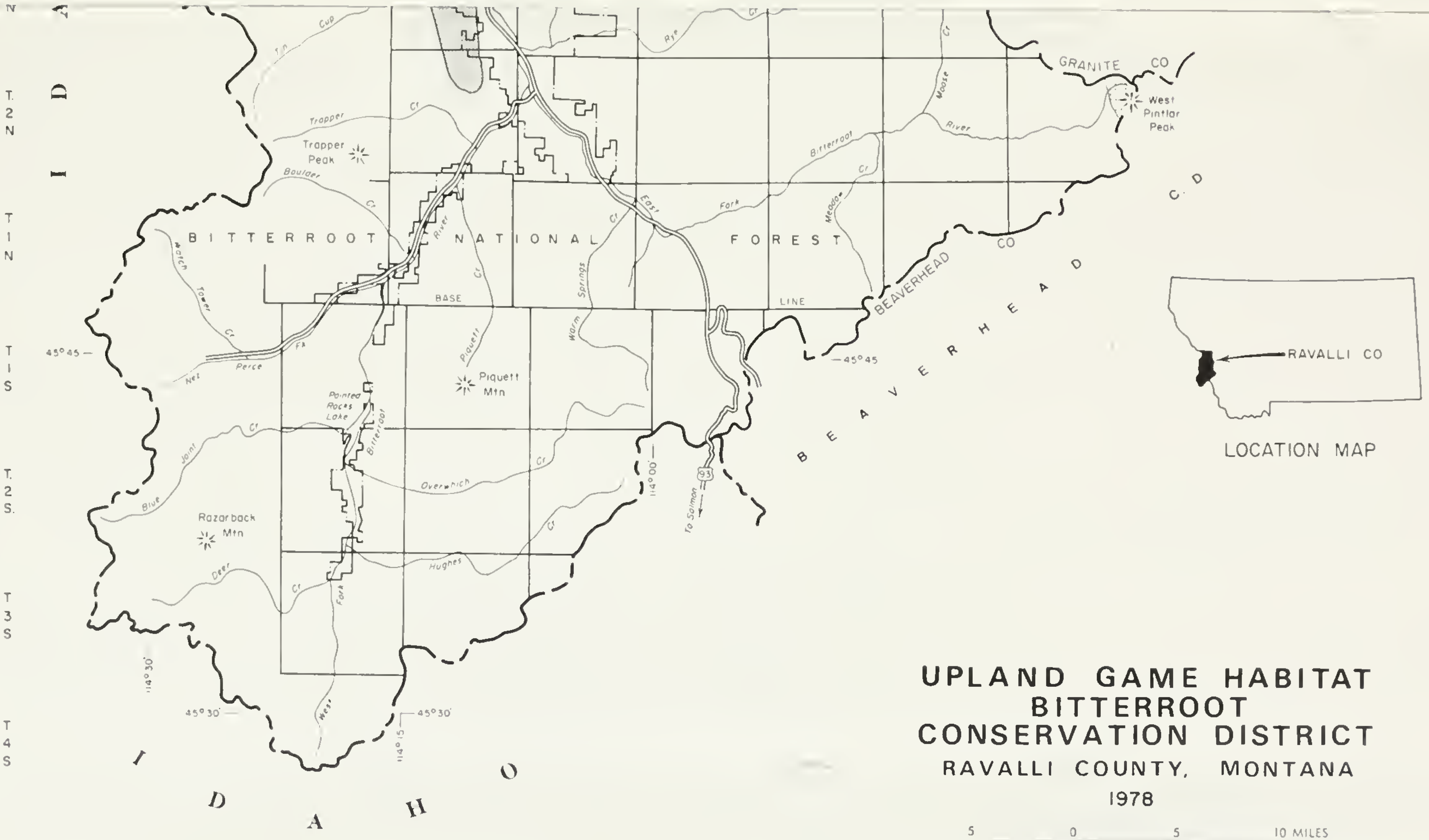
M7-EN-23991-12



UPLAND GAME HABITAT
BITTERROOT CONSERVATION DISTRICT

RAVALLI COUNTY, MONTANA

1978

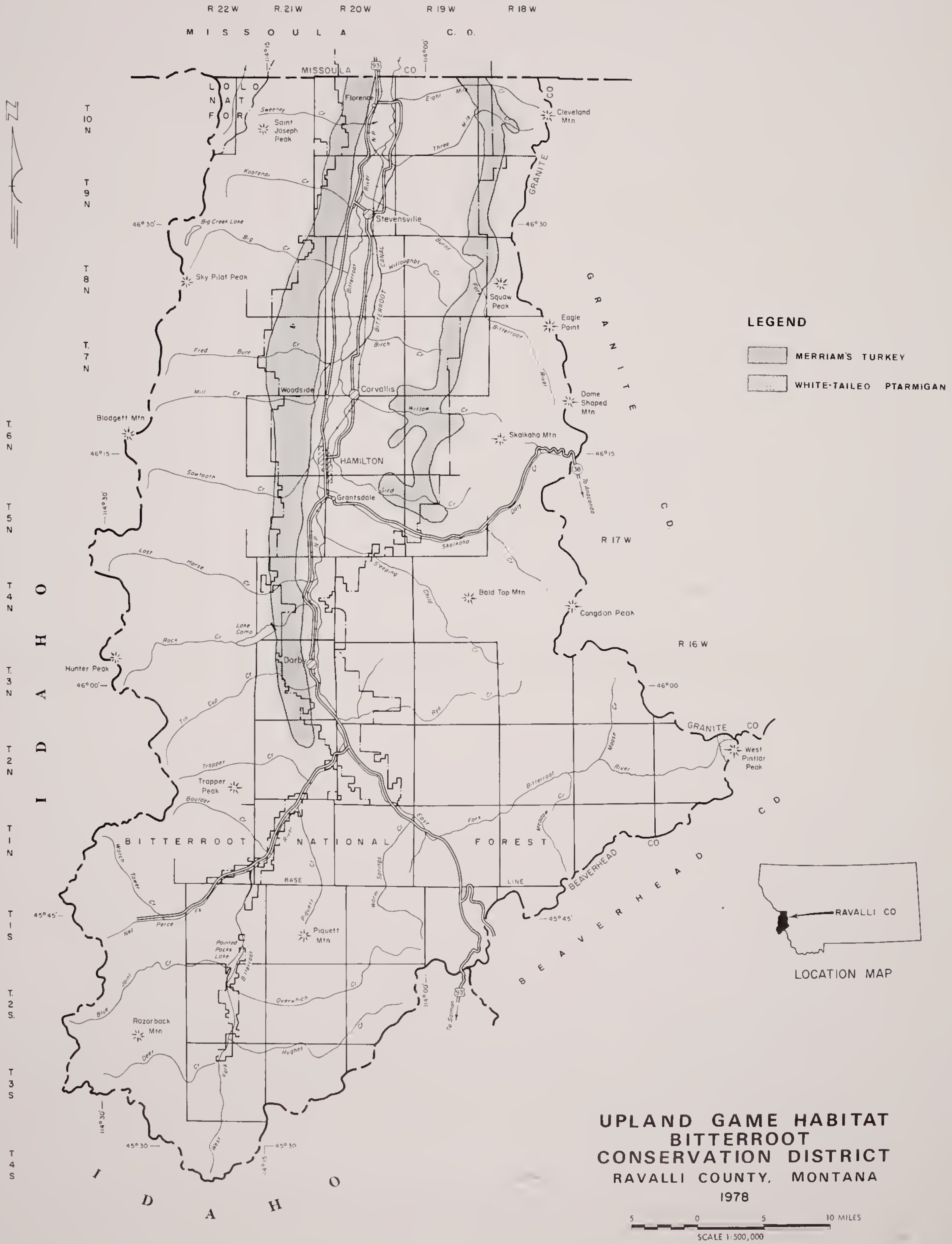


UPLAND GAME HABITAT
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

5 0 5 10 MILES

SCALE 1:500,000

UPLAND GAME HABITAT
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

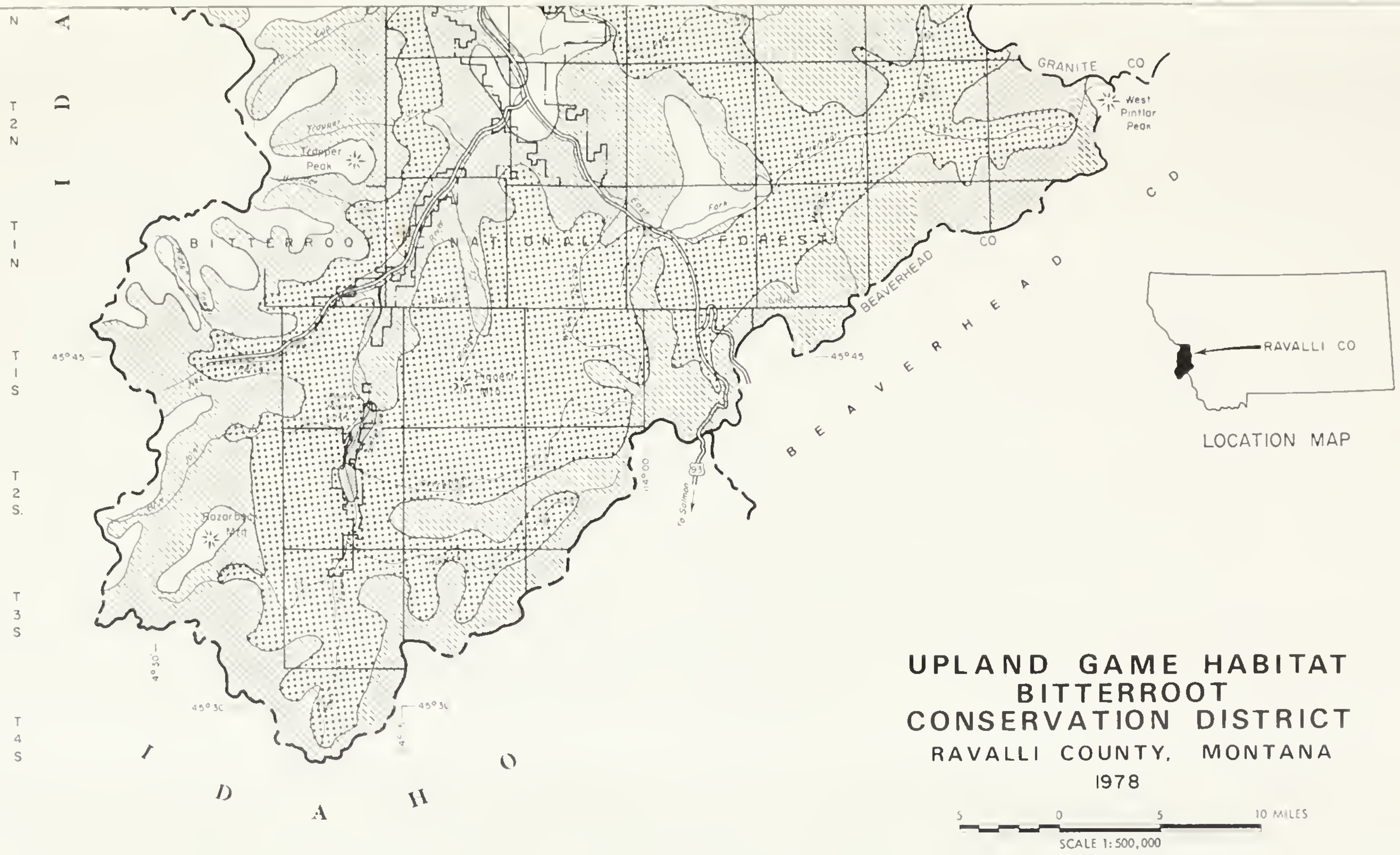


Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.

U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

USDA SCS-PORTLAND OR 1979

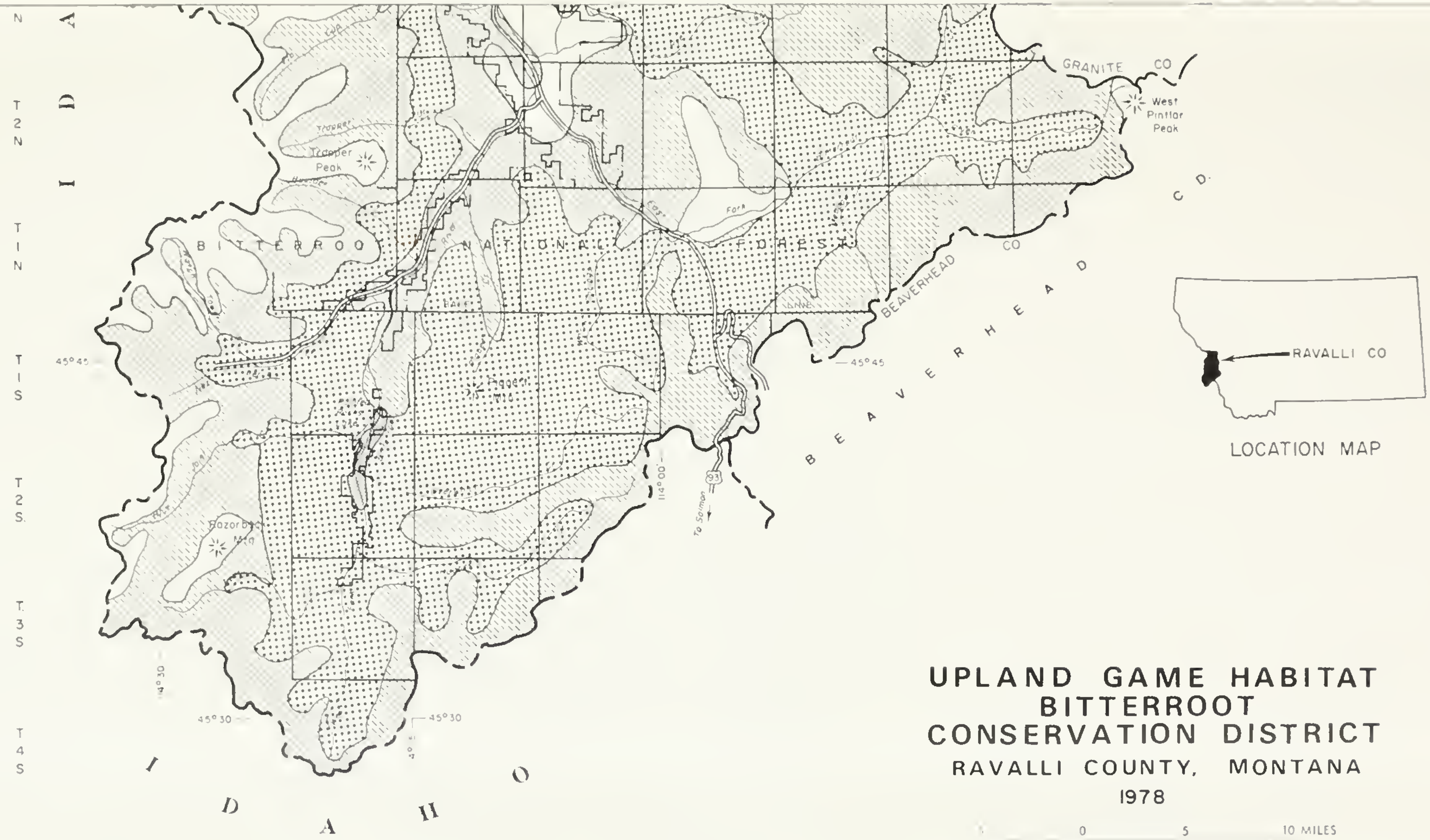
M7-EN-23991-10



UPLAND GAME HABITAT
BITTERROOT CONSERVATION DISTRICT

RAVALLI COUNTY, MONTANA

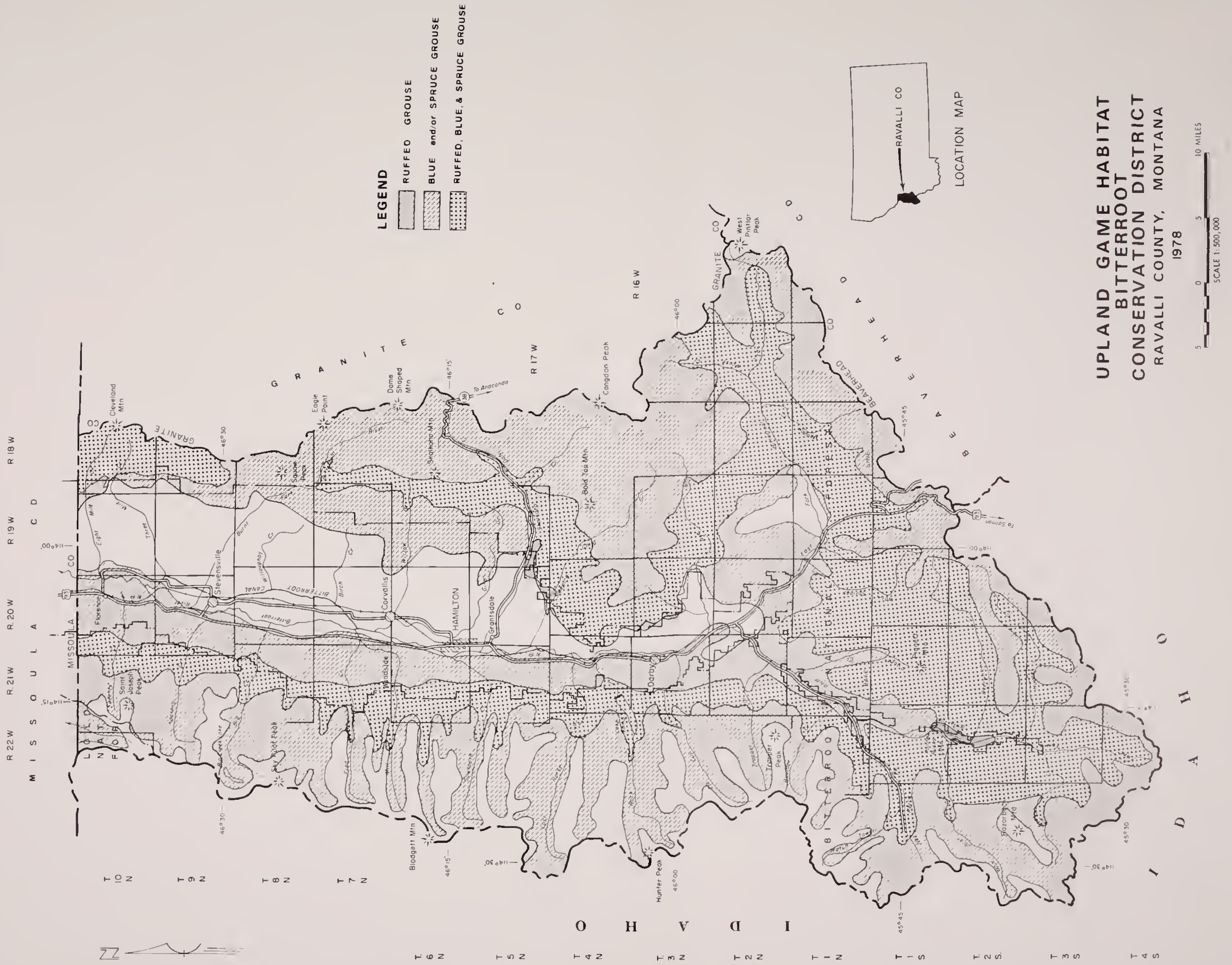
1978



UPLAND GAME HABITAT
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

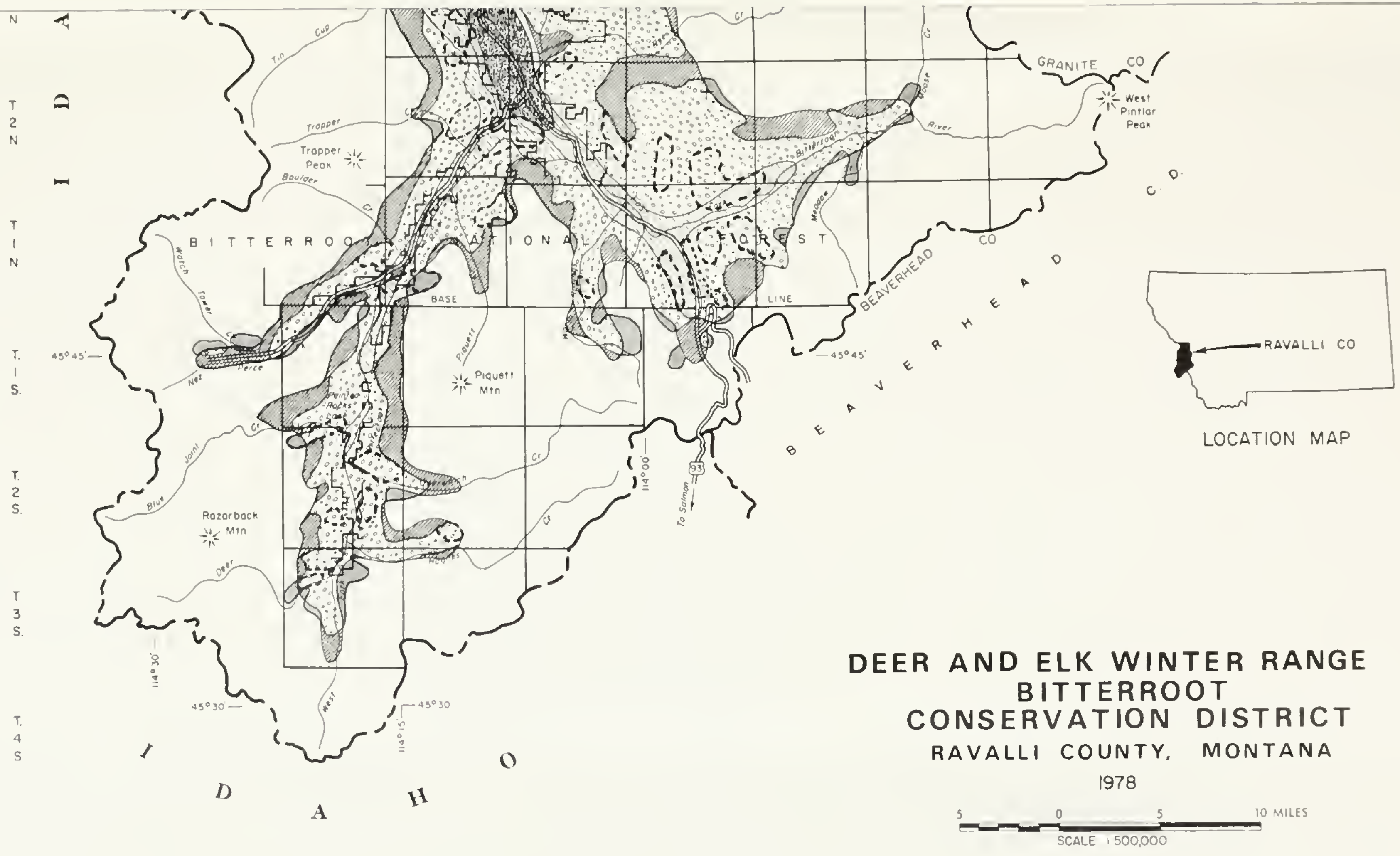
M7-EN-23991-II

UPLAND GAME HABITAT
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978



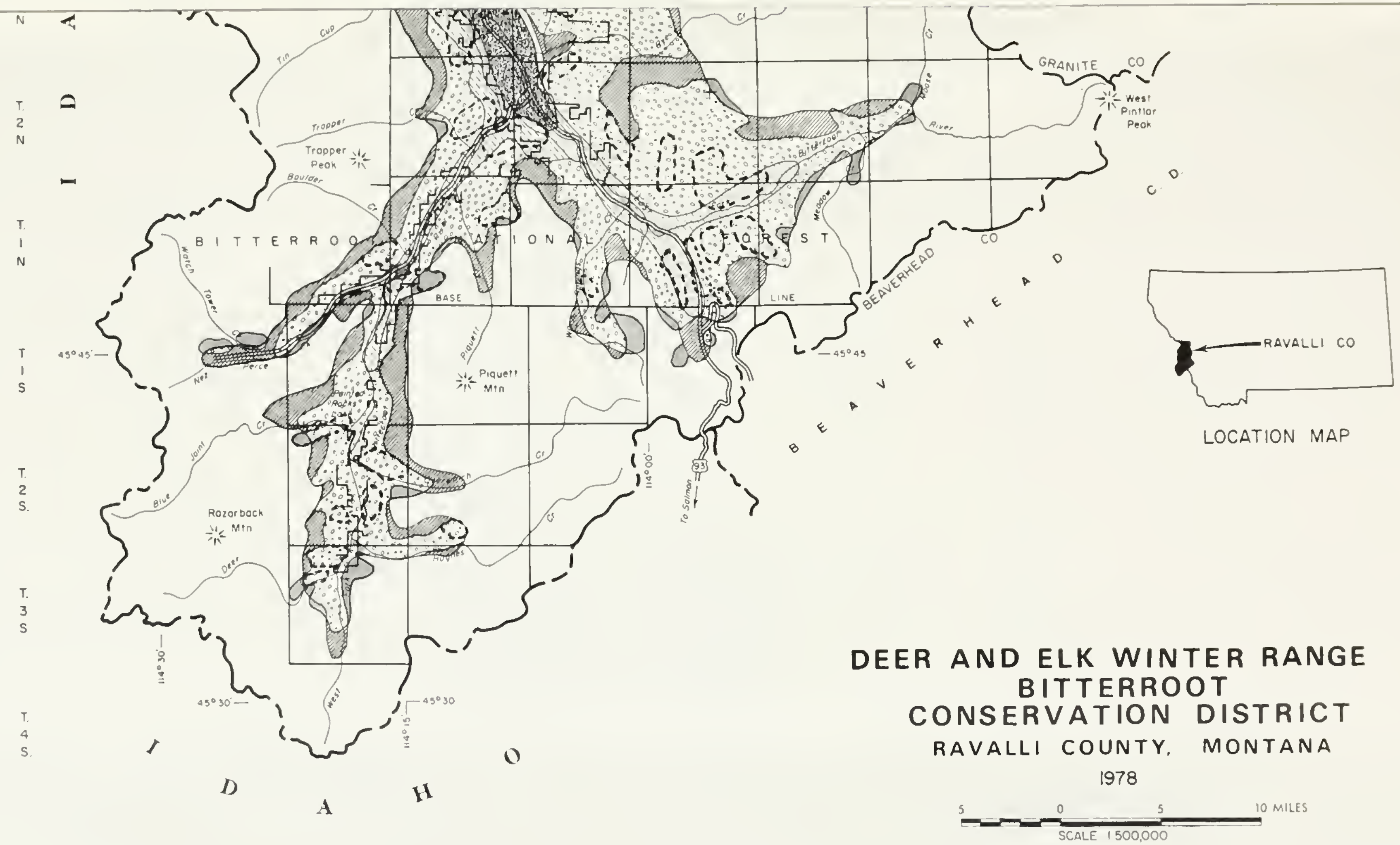
Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

USDA-SCS-PORTLAND OR 1979



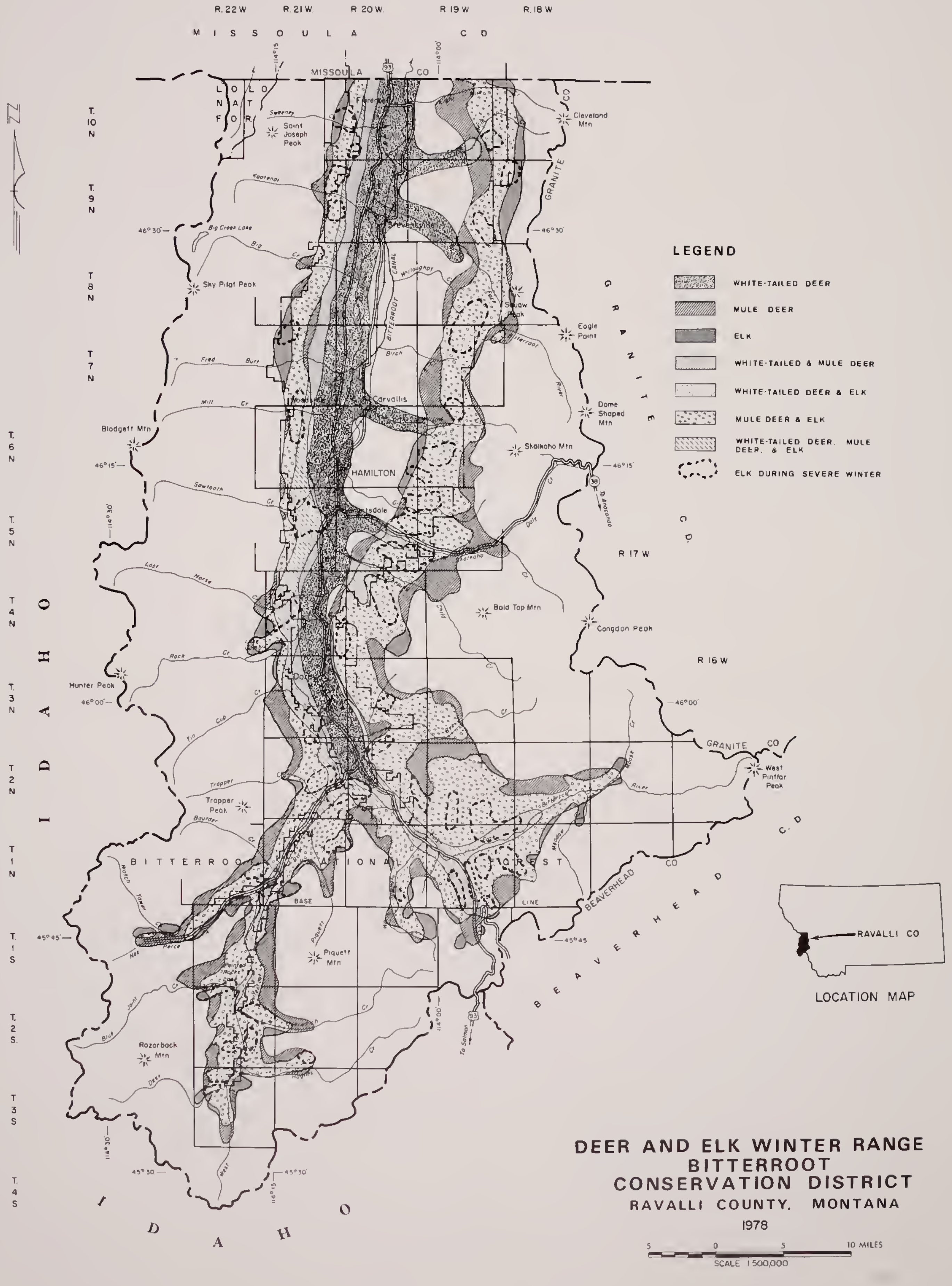
DEER AND ELK WINTER RANGE
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA

1978



DEER AND ELK WINTER RANGE
BITTERROOT
CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA

1978



DEER AND ELK WINTER RANGE
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.
U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

USDA SCS PORTLAND OR 1979

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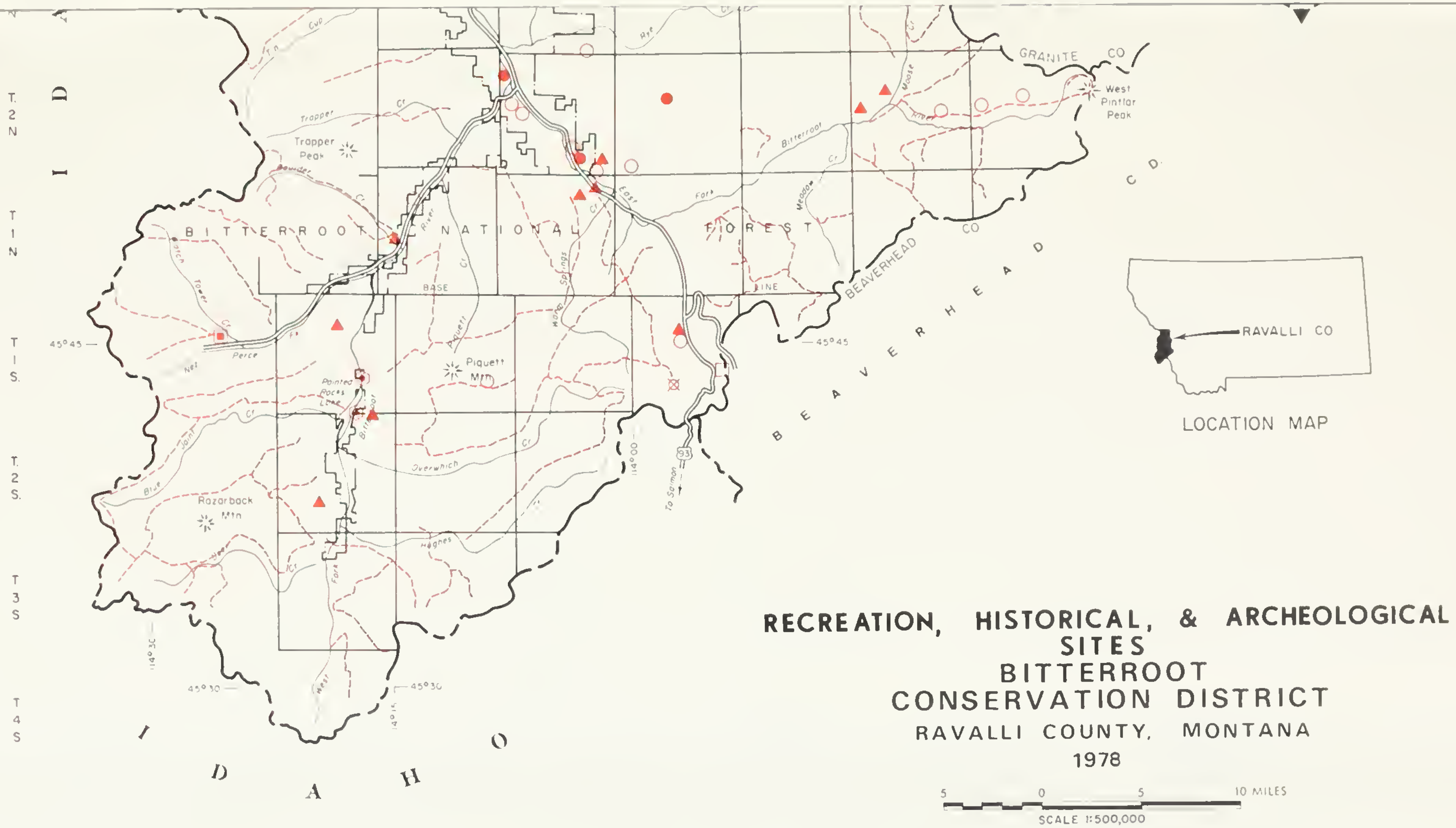
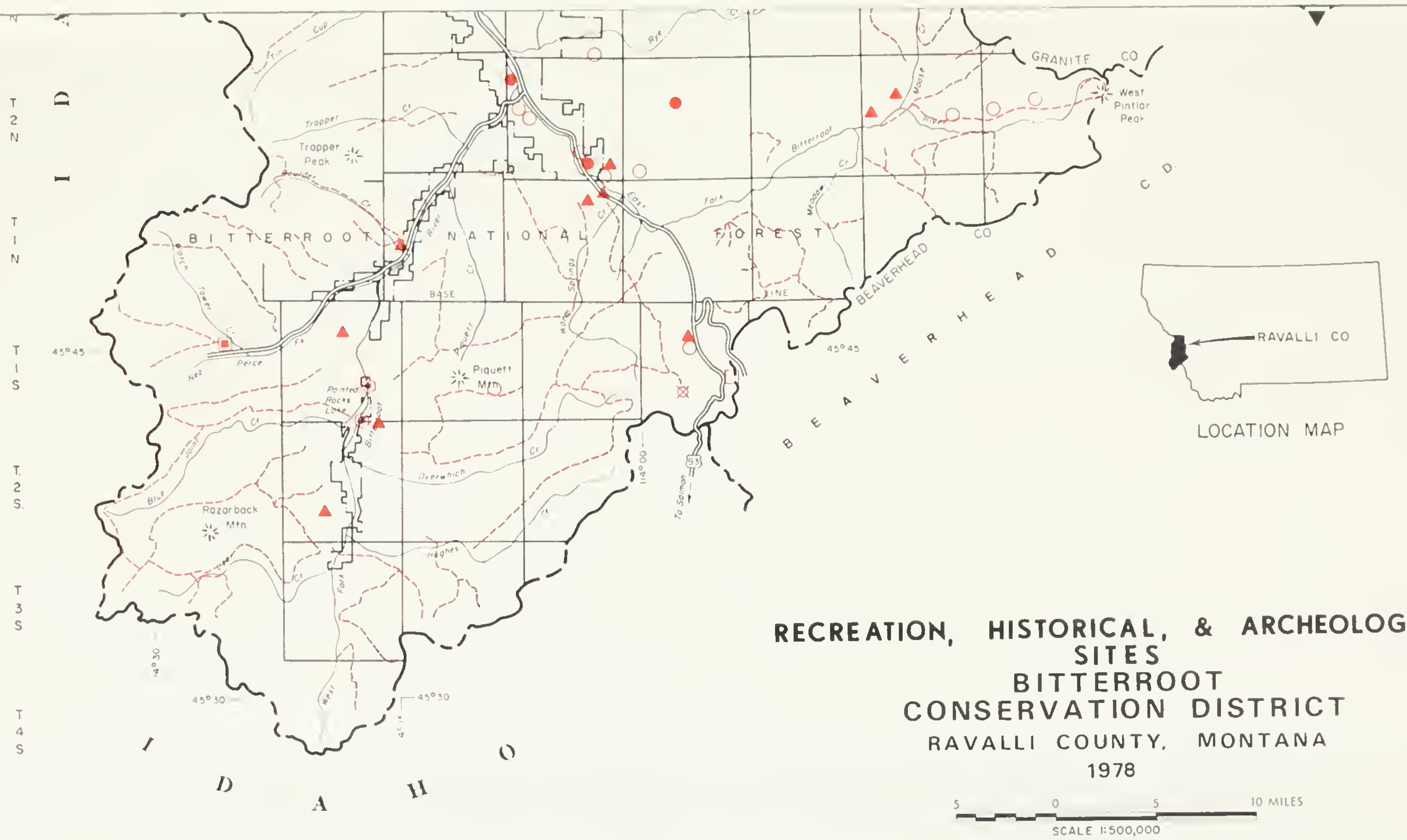


RECREATION, HISTORICAL, & ARCHEOLOGICAL SITES
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

M7-EN-23991-17

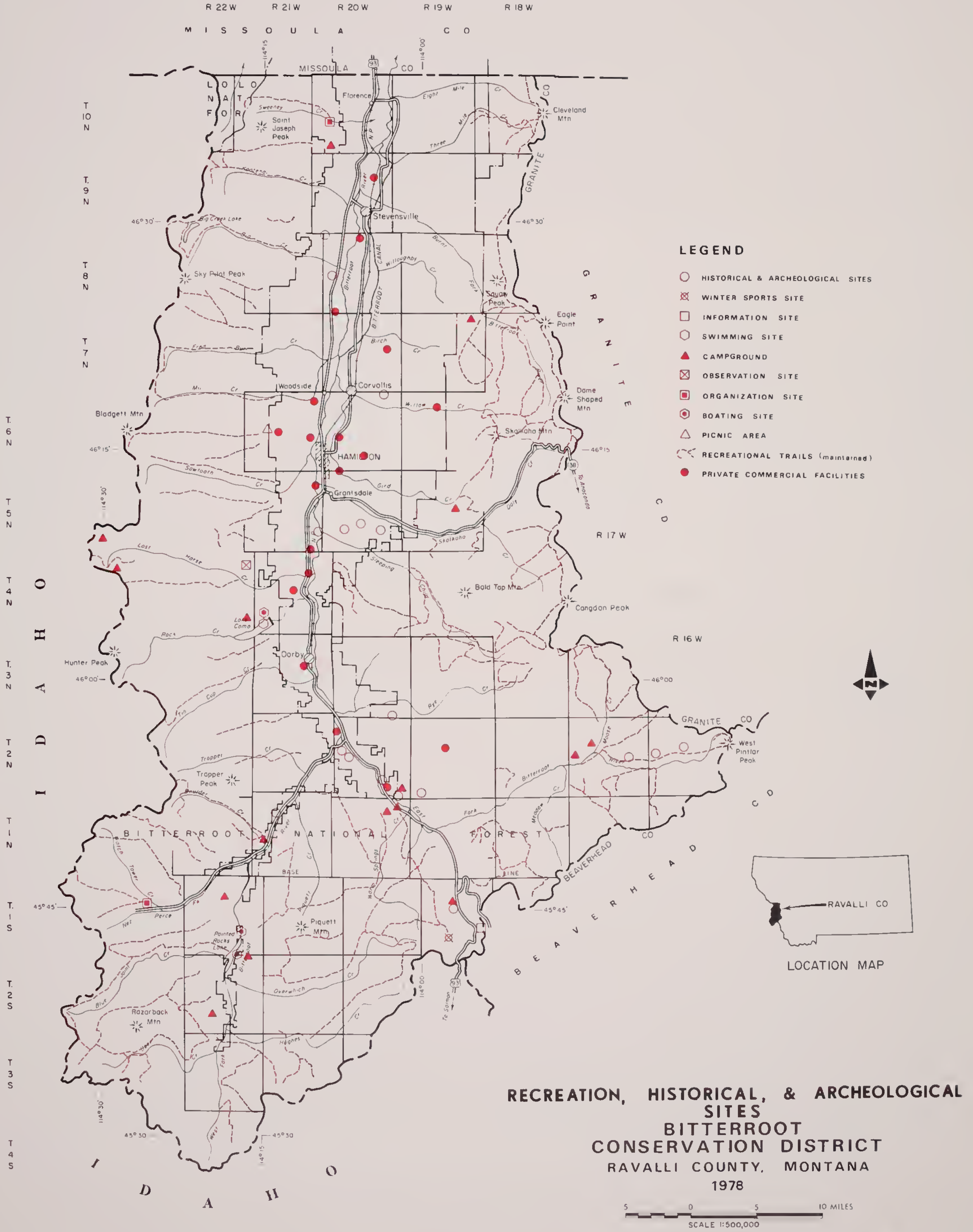


RECREATION, HISTORICAL, & ARCHEOLOGICAL SITES

BITTERROOT CONSERVATION DISTRICT

RAVALLI COUNTY, MONTANA
1978

M7-EN-23991-17



RECREATION, HISTORICAL, & ARCHEOLOGICAL SITES
BITTERROOT CONSERVATION DISTRICT
RAVALLI COUNTY, MONTANA
1978

Source:
Base map prepared by SCS, WTSC Carto Unit from AMS 1:250,000 series.
Thematic detail prepared by state staff.

U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
USDA SCS PORTLAND OR 1979

M7-EN-23991-17

Appendix E.

Permits Necessary for Conservation Practices in Ravalli County

1. Water Rights
   - a. New use - Form 600
   - b. Declaration of existing water rights - Form 605
   - c. Change of use - Form 606

   Contact:
   Water Rights Bureau Field Office
   818 Burlington Avenue, Room 200
   Missoula, MT 59801
   1-721-4284

2. Natural Streambed and Land Preservation Act, SB-310

   Contact:
   Bitterroot Conservation District
   111 Old Corvallis Road
   Hamilton, MT 59840
   363-5010

3. Short-Term Construction, Section 6G

   Contact:
   Water Quality Bureau
   Dept. of Health & Environmental Sciences
   Helena, MT 59601

4. Septic Tank Permit

   Contact:
   County Sanitarian
   Ravalli County Courthouse
   Hamilton, MT 59840
   363-4940

5. Special Use Permit

   Contact:
   Supervisor, Bitterroot National Forest
   316 North 3rd Street
   Hamilton, MT 59840
   363-3131

6. Waste Discharge Permit

   Fish raceways, others - Short Form C

   Contact:
   Water Quality Bureau
   Dept. of Health & Environmental Sciences
   Helena, MT 59601

7. Commercial Fish Pond Permit, Private Fish Pond License

   Contact:
   Dept. of Fish, Wildlife & Parks
   3309 Brooks
   Missoula, MT 59801
   1-721-5808

Appendix E.

Permits Necessary for Conservation Practices in Ravalli County

1. Water Rights
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   3309 Brooks
   Missoula, MT 59801
   1-721-5808

Appendix E. (cont'd)

Permits Necessary for Conservation Practices in Ravalli County

8. 404 Application Procedures

Application Form No.
ENG Form 4345, 1 April 74
Max. paper size for drawings
8" x 10-1/2"

Contact:
Corps of Engineers
Permit Section, P.O. Box C-3755
Seattle, WA 98124
1-206-764-4395

A copy of the application for the permit and all attachments are to be sent for review to the following agencies:

U.S. Dept. of the Interior
Fish and Wildlife Service
Federal Building, Room 3035
316 North 26th Street
Billings, MT 59101

Environmental Protection Agency
Region VIII
1860 Lincoln Street
Denver, CO 80203

Appendix F.

Primary Governmental Agencies that Deal with Water Quality

1. Environmental Protection Agency
   Federal Building
   301 South Park, Drawer 10096
   Helena, MT 59601
   1-449-5432

2. Montana Dept. of Health & Environmental Sciences
   Water Quality Bureau
   555 Fuller Avenue
   Helena, MT 59601
   1-449-2406

3. U.S. Soil Conservation Service
   P.O. Box 970
   Bozeman, MT 59715
   1-587-5271

   Or your local SCS agent and Conservation District Board of Supervisors

4. Montana Dept. of Fish, Wildlife and Parks
   1420 East 6th Avenue
   Helena, MT 59601
   1-449-2535

   Or your local Fish and Game Officer

BITTERROOT CONSERVATION DISTRICT

LONG RANGE PLAN

SUPPLEMENT I

208 Water Quality Management Plan
Non-point Pollution Sources

May, 1980

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A. Introduction

The Bitterroot Conservation District has undertaken a concerted effort to address and to work toward the alleviation of the degradation of the water quality of the Bitterroot River. This Supplement to the Conservation District's Long Range Plan sets down the basis for a non-point source pollution control program with the help, cooperation and assistance of the Montana Dept. of Natural Resources and Conservation (DNRC) and the Montana Dept. of Health and Environmental Sciences (DHES).

1.1 Authorization

1.11 Federal Regulation - Section 208 of Public Law 92-500, 1972 Federal Water Pollution Control Act Amendments (Sec. 208).

Sec. 208 provides local areas with an opportunity to plan and manage a comprehensive pollution control program for municipal and industrial waste water, storm and combined sewer runoff, non-point source pollutants and land use as it relates to water quality. Through a locally controlled planning agency, an area can select a cost-effective and institutionally feasible plan directed to meet the goals of the Act. Particular emphasis is placed upon non-structural approaches to pollution control (e.g. land management) rather than traditional structural measures normally requiring large investments.

1.12 State Regulation - Montana Water Pollution Control Law, Title 75, Chapter 5, Montana Codes Annotated, 1979.

The Montana Dept. of Health and Environmental Sciences (DHES) is responsible for the administration of the state's Water Pollution Control Law. The Water Quality Bureau within the Department is responsible for all functions of the Department concerning matters of water pollution, including the issuance of waste discharge permits, enforcement of the Law and rules thereof, and carrying out water quality monitoring and investigations.

The purpose of the Law is to provide additional and cumulative remedies to prevent, abate and control the pollution of state waters.

1.13 Supplement to Memorandum of Understanding between the Bitterroot Conservation District and the Montana Department of Natural Resources and Conservation.

This is a supplement to the Memorandum of Understanding entered into between Bitterroot Conservation District (CD) and the Montana Department of Natural Resources and Conservation (DNRC) on the 31st day of August, 1978. The purpose of this supplement is to provide the basis for a non-point source pollution control program involving the preceding agencies and the Montana Department of Health and Environmental Sciences (DHES).

Bitterroot Conservation District, DNRC, and DHES shall cooperate to develop and implement a water quality management plan pursuant to the authorities, responsibilities and goals outlined in Section 208 of the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500) and the Federal Clean Water Act of 1977 (P.L. 95-217), and the Montana Water Pollution Control Act (Section 69-4801 et. seq., R.C.M. 1947).

Bitterroot Conservation District is, by this agreement, designated by the Montana Department of Health and Environmental Sciences, as the non-point source water quality management agency within the District's boundaries with responsibilities as herein enumerated, and DNRC is assigned the responsibility of state coordination of the efforts of all Montana conservation districts.

Soil conservation and water quality are mutual concerns of the Conservation District, DHES, and DNRC; therefore, the parties agree as follows:

I. DNRC shall within statutory, administrative, and funding limitations:

   A. Develop jointly with DHES guidelines for the CD's use in developing its water quality plan. These guidelines shall include methods for inventory assessments, planning, and policy alternatives, which when implemented will prevent or correct non-point source pollution problems. DNRC shall seek the assistance of the Montana Association of Conservation Districts and the Soil Conservation Service (SCS) of the U.S. Department of Agriculture in the development of these guidelines.

   B. Provide assistance to the CD in the selection and adoption of best management practices to fit local needs.

   C. Cooperate with DHES in providing education, information and other assistance in the area of water quality management to the CD.

   D. Serve as state-wide coordinator and act as liaison between the CD, DHES, Environmental Protection Agency (EPA), and other agencies as necessary.

   E. Review and evaluate the CD's annual work report.

II. DHES shall within statutory, funding and administrative limitations:

   A. Provide upon request technical assistance to the CD in the development of a water quality management plan.

B. Assist in obtaining financial support for the CD for the development and implementation of the water quality management plan. As monies for rural water quality programs become available, DHES shall, to the extent possible, make those funds available to the CD.

C. Cooperate with the CD in arriving at solutions to water quality problems which the CD is unable to solve. Initiate enforcement action as deemed necessary in cases where water quality standards are being violated.

D. Notify the CD of new non-point source problems for possible mitigation by the CD.

E. Cooperate with the CD in documenting non-point source problems and make available as requested water quality monitoring and analyzing services.

F. Work cooperatively with DNRC in providing education, information, and other assistance to the CD.

G. Keep DNRC and the CD informed of new developments in non-point source programs.

H. Assist DNRC in the review and evaluation of the CD's annual work report.

III. The CD shall within statutory and funding limitations:

A. Prepare, with assistance from DNRC and DHES, a master water quality management plan for the area within the CD's boundaries for the abatement of non-point source problems. The plan shall be updated and revised from time to time. The plan, as a minimum, shall include the following:

(1) Identification of existing and potential non-point source problems,

(2) prioritization of severity of problems,

(3) selection and adoption of best management practices which can be applied to correct identified problems, and

(4) establishment of realistic schedules for abatement of the identified problems.

B. Consider acceptance of funds provided for water quality purposes to carry out the planning, administration, education-information, technical assistance, and cost-sharing functions of a water quality management program either unilaterally or in cooperation with agencies with which the CD has working agreements, such as the SCS, Extension Service, Agricultural Stabilization and Conservation Service, DHES, and EPA.

C. Conduct an education-information program within the CD to inform residents of the significance of water quality management. As a part of this program, the CD shall contact landowners with non-point source pollution problems and offer assistance in bringing about a solution.

D. Annually prepare and submit to DNRC and DHES copies of a work report. The annual work report shall outline accomplishments, next year's goals, budget constraints, etc.

E. Receive complaints of non-point source problems originating within the district and work cooperatively with the landowners to solve the problems. Should the CD be unable to obtain cooperation, the CD shall notify DHES of the situation.

Other provisions, special projects and activities may be included and are attached as Exhibit A and incorporated herein by reference.

This supplement to Memorandum of Understanding shall be effective when signed by each of the parties and may be terminated by mutual agreement or by any party upon thirty (30) days' notice in writing to the other parties.

Date 8-27-78

Bitterroot Conservation District

By: /s/ Leonard G. Peterson
Chairman, District Board of Supervisors

Date 8-31-78

Montana Department of Natural Resources and Conservation

/s/ Ted J. Doney
Director

Date 8-31-78

Montana Department of Health and Environmental Sciences

/s/ R. A. James
Director

Distribution: Conservation District; Forestry Division; Water Resources Division; Conservation Districts Division; DNRC Director; Water Quality Bureau; DHES Director; DHES Legal Division.

1.2 Policy of the Bitterroot Conservation District

It is the policy of the Bitterroot Conservation District to develop and implement a water quality management plan pursuant to the regulations described in Section 1.1 of this Supplement.

B. Problem Identification

1.1 Problem Area Priorities

The following is a listing of critical problem areas in their order of priority, beginning with the top priority (most severe):

a. Rye Creek Drainage - excessive sedimentation, eroding banks

b. Ambrose Creek Drainage - excessive sedimentation, eroding banks

c. Willow Creek Drainage - excessive sedimentation, eroding banks

d. Eight Mile Creek Drainage - excessive sedimentation, eroding banks

e. Sleeping Child Creek Drainage - excessive sedimentation, channel degradation

f. Moose Creek Drainage - excessive sedimentation

g. Blodgett Creek Drainage - excessive sedimentation

h. Kootenai Creek Drainage - excessive sedimentation

1.2 Problem Area Locations

The U.S. Department of Agriculture, Soil Conservation Service, Bozeman, Montana, provided the Bitterroot Conservation District with the following information on problem areas along the Bitterroot River corridor. Aerial photographs were taken of the river corridor during 1976 and 1978; the inventory was conducted by walking and floating the river during the fall of 1978. The aerial photographs, at a scale of 1" equals 3000' are individually numbered, and the physical features noted during the inventory are marked on each aerial photo. The locations of the aerial photos are noted on the Forest Service base map in this Section. The following is a listing of the features noted for each keyed aerial photo:

Symbol Legend

Symbol	Definition
CA	1. Visible Man-caused channel alterations
	2. Streambank alterations
RR	a. rock riprap
RJ	b. rock jetties
CB	c. car bodies
	d. other (concrete wall and dikes)
RG	e. river gravel
TJ	f. timber jetties
I	3. Irrigation takeoffs
IR	Irrigation returns
EB	4. Eroding banks
SS	5. Critical sediment sources
	6. Streambank vegetation
T	a. woody trees and shrubs
H	b. herbaceous
	7. Streambed materials
P, R	8. Pools and riffles; runs are a major component of the term "pool"
O	9. Obstructions
	10. Trash; includes any unnatural objects, excluding car bodies, placed in the river system; including box springs, tires and sunken boats
D	Debris

Map No.	Physical Features Noted
1-1	SS, H, EB, T, R
1-2	T, R, CB
1-3	SS, H, EB, T, R, RJ, RR
1-4	H, T, R, CB, RR
1-5	SS, H, T, R, CB
1-6	SS, H, EB, T
1-7	H, EB, T, R, CB D
1-8	SS, H, T, R, RR, I
1-9	H, EB, T, R RR
2-1	H, T, R
2-2	SS, H, T, R
2-3	SS, H, EB, T, R

Map No.	Physical Features Noted
2-4	SS, EB, T, R
2-5	H, T, R, CA
2-6	SS, H, EB, T, R
3-2	SS, H, T, R, CB, RR
3-3	T, R
3-4	T, R
3-5	SS, H, EB, T, R, I
3-6	H, EB, T, CB, D
3-7	SS, T, CB, D
3-8	H, EB, T, R, CB, RR
3-9	SS, H, EB, T, R, RR
3-10	SS, H, T, R, RR
4-1	SS, T, R, RR
4-2	EB, T, R
4-3	H, T, R
4-4	H, EB, T, R
4-5	H, T, R, IR
4-6	H, T, R, CB, IR
4-7	EB, T, R, IR
4-8	EB, T, R, CB, RR
4-9	EB, T, R, CB, IR
4-10	H, EB, T, R, CB
4-11	H, T, R, CB, RR
4-12	T, R, RR
4-13	T, R, RR
5-1	H, T, R, RR
5-2	H, T, R, RR
5-3	H, T, R, RR, IR
5-4	H, T, R, P
5-5	SS, H, EB, T, R,
5-6	SS, H, T, R, RR
5-7	SS, H, T, R, P
7-1	H, EB, T, R, RR
7-2	H, EB, T, R, RR
7-3	H, EB, T, R, RR
7-4	T, R, RR
7-5	H, EB, T, R
7-6	H, EB, T, R
7-7	R
7-8	SS, H, EB, T, R
7-9	H, EB, T, R, RR
7-10	T, R, CB, RR
7-11	H, T, R, RR
7-12	SS, H, EB, T, R
7-13	H, EB, T, R
7-14	H, EB, T, R, CA
7-15	H, EB, T, R, RJ, D, CA
7-16	H, EB, T, R, RR
7-17	H, EB, T, R

Map No.	Physical Features Noted													
7-18		H,	EB,	T,	R,			RR,		I,	P,	CA		
7-19		H,	EB,	T,	R									
7-20	SS,	H,	EB,	T,	R,						P			
7-21	SS,	H,		T,	R									
7-22	SS,	H,	EB,	T,	R,				D					
7-23	SS,	H,	EB,	T,	R									
7-24		H,	EB,	T,	R									
7-25		H,		T,	R,			RR						
7-26		H,	EB,	T,	R									
7-27				T,	R									
7-28				T,	R									
7-29		H,		T,	R									
7-30			EB,	T,	R,			RR						
7-31		H,	EB,	T,	R,			RR,		I,			O	
8-2		H,		T,	R,							CA,		RG
8-3				T,	R,							CA		
8-4				T,	R									
8-5	SS,	H,		T,	R,			RR						
8-6		H,		T,	R,	CB,		RR						
8-7		H,	EB,	T,	R,									
8-8		H,		T,	R,			RR,						RG
8-9		H,		T,	R,		RJ,	RR						
8-10		H,	EB,	T,	R,			RR						
8-11		H,	EB,	T,	R,			RR,						RG
8-12		H,		T,	R,			RR,						
8-13		H,		T,	R,	CB,		RR,						RG
8-14		H,	EB,	T,	R									
8-15		H,	EB,	T,	R,			RR						
8-16			EB,	T,	R									
10-6		H,	EB,	T,	R,			RR,	D,			CA		
10-7				T,	R,	CB,		RR,				CA		
10-8			EB,	T,	R,				D					
10-9		H,	EB,	T,	R,					I				
10-10		H,		T,	R,					IR				
10-11		H,		T,	R,		RJ,		D					
10-12				T,	R,			RR,		I,			O	
10-13		H,		T,	R,			RR						
10-14		H,	EB,	T,	R,			RR,				CA		
11-1		H,	EB,	T,	R									
11-2		H,	EB,	T,	R,			RR						
11-3	SS,	H,	EB,	T,	R,					IR				
11-4	SS,	H,	EB,	T,	R									
11-5			EB,	T,	R									
11-6			EB,	T,	R									
11-7			EB,	T,	R									
11-8			EB,	T,	R,	CB,			D					
11-9	SS,	H,	EB,	T,	R									
11-10		H,	EB,	T,	R,					I				
11-11		H,		T,	R,	CB,		RR						
11-12		H,		T,	R,			RR,		I				

Map No.	Physical Features Noted												
11-13			EB,	T,	R,				I				
11-14		H,		T,	R,					CA			
11-15			EB,	T,	R,		RJ						
11-16	SS,	H,	EB,	T,	R,			RR					
11-17	SS,	H,	EB,	T,	R								
11-18		H,	EB,	T,	R								
11-19		H,	EB,	T,	R,					CA,	O		
11-20				T,	R								
11-21				T,				RR					
12-1		H,	EB,	T,	R								
12-2		H,		T,	R								
12-3		H,		T,	R								
12-4		H,		T,	R								
12-5			EB,	T,	R								
13-1		H,	EB,	T,	R								
13-2		H,	EB,	T,	R,			RR					
13-3		H,		T,	R,			RR					
13-4	SS,	H,	EB,	T,	R,			RR					
13-5		H,		T,	R,			RR					
13-6		H,		T,	R,			RR,	I,		O		
13-7		H,		T,	R								
13-8	SS,			T,	R								
13-9		H,	EB,	T,	R,				I				
14-2				T,	R,			RR					
14-3				T,	R,			RR					
14-4				T,	R,			RR					
14-5		H,		T,	R								
14-6	SS,	H,	EB,	T,	R,				IR				
14-7		H,		T,	R,				IR				
19-1		H,		T,	R								
19-2				T,	R,			RR					
19-3				T,	R								
19-4			EB,	T,	R								
19-5			EB,	T,	R								
19-6				T,	R,			RR					
19-7		H,		T,	R,			RR					
19-8		H,	EB,	T,	R,			RR					
19-9	SS,	H,	EB,	T,	R,					CA,		RG	
19-10			EB,	T,	R,			RR					
19-11				T,	R,	CB,		RR					
19-12		H,	EB,	T,	R								
19-13			EB,	T,	R,			RR					
19-14			EB,	T,	R,							RG	
19-15		H,	EB,	T,	R,			RR					
19-16	SS,		EB,	T,	R,								RB
19-17				T,	R,	CB,			I				
19-18		H,	EB,	T,	R								

Map No.	Physical Features Noted											
19-19			T,	R,			D					
19-20			T,	R,	CB,		D					
19-21	H,		T,	R,		RR						
19-22	H,		T,	R								
19-23		EB,	T,	R								
19-24	H,	EB,	T,	R,	CB							
19-25	H,	EB,	T,	R,		RR,					RG,	B
19-26	H,		T,	R,							RG	
19-27	H,	EB,	T,	R								
20-2	H,	EB,	T,	R,		RR						
20-3	H,		T,	R,		RR,	D,	TJ				
20-4	H,		T,	R,		RR,		TJ,	I			
20-5			T,	R								
20-6			T,	R,		RR						
20-7	H,	EB,	T,	R,		RR						
20-8	H,	EB,	T,	R								
20-9	H,		T,	R,		RR						
20-10	H,		T,	R,		RR,				CA		

C. Best Management Practices

1.1 Sedimentation

a. Promotion of education relating to water quality protection measures applicable to silviculture, agriculture, construction and irrigation practices.

b. Location of roads away from streams; avoidance of fiords

c. Logging skid trails properly and appropriately located

d. Reseeding of critical areas

e. Proper drainage of runoff surfaces

f. Proper grazing methods and watering locations

g. Proper stocking and tillage practices

h. Protection of vegetation, both woody species and grasses, along streams

i. Use of adequate-sized culverts

j. Establishment of appropriate land uses

k. Cooperative efforts to establish a comprehensive management program

1.2 Streambank Erosion

a. Education relating to streambank stabilization and management

b. Installation of rock rip-rap and rock jetties

c. Fencing to protect critical areas

d. Establishment of appropriate vegetation

e. Establishment of appropriate land uses

1.3 Thermal Pollution

a. Maintenance and encouragement of appropriate vegetation along streams

b. Prevention of logging adjacent to streams

c. Coordinated silviculture activities on a watershed basis

D. Implementation Schedule

Activity	Completion Date	Responsible Organization
1. Establish detailed critical problems in priority drainages		BRCD SCS
2. Determine appropriate program approaches to critical problem areas		BRCD SCS
3. Determine availability of funding and resources to carry out program approaches		BRCD
4. Obtain commitments to program approaches from appropriate agencies and organizations		BRCD

	Activity	Completion Date	Responsible Organization
5.	Establish plan of work for agencies and organizations involved in addressing critical areas		BRCD & appropriate agencies and organizations
6.	Set up education program		BRCD SCS USFS
7.	Project determination and construction design		SCS
8.	Installation of best management practices		BRCD SCS
9.	Project completions		BRCD

E. Evaluation

1.1 Monitoring System

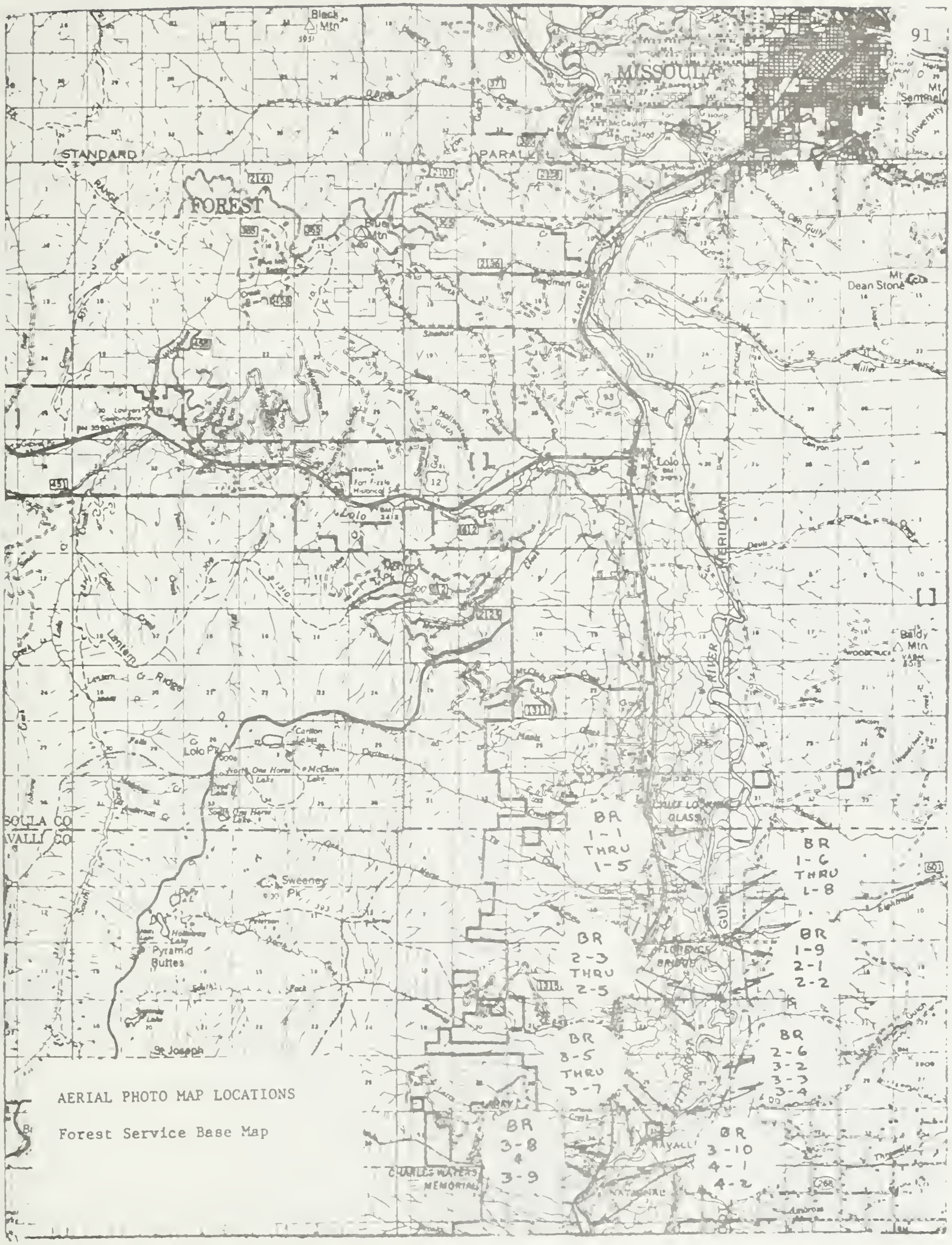
The Bitterroot Conservation District will seek to establish a cooperative arrangement which will maximize the potential of existing state monitoring systems. Best management practices, as they are established and installed, will be monitored for effectiveness depending on available resources.

1.2 Reporting System

The Bitterroot Conservation District will work towards a more accurate identification of non-point pollution problems and causes; and will seek to coordinate education programs with appropriate agencies, organizations and individuals.

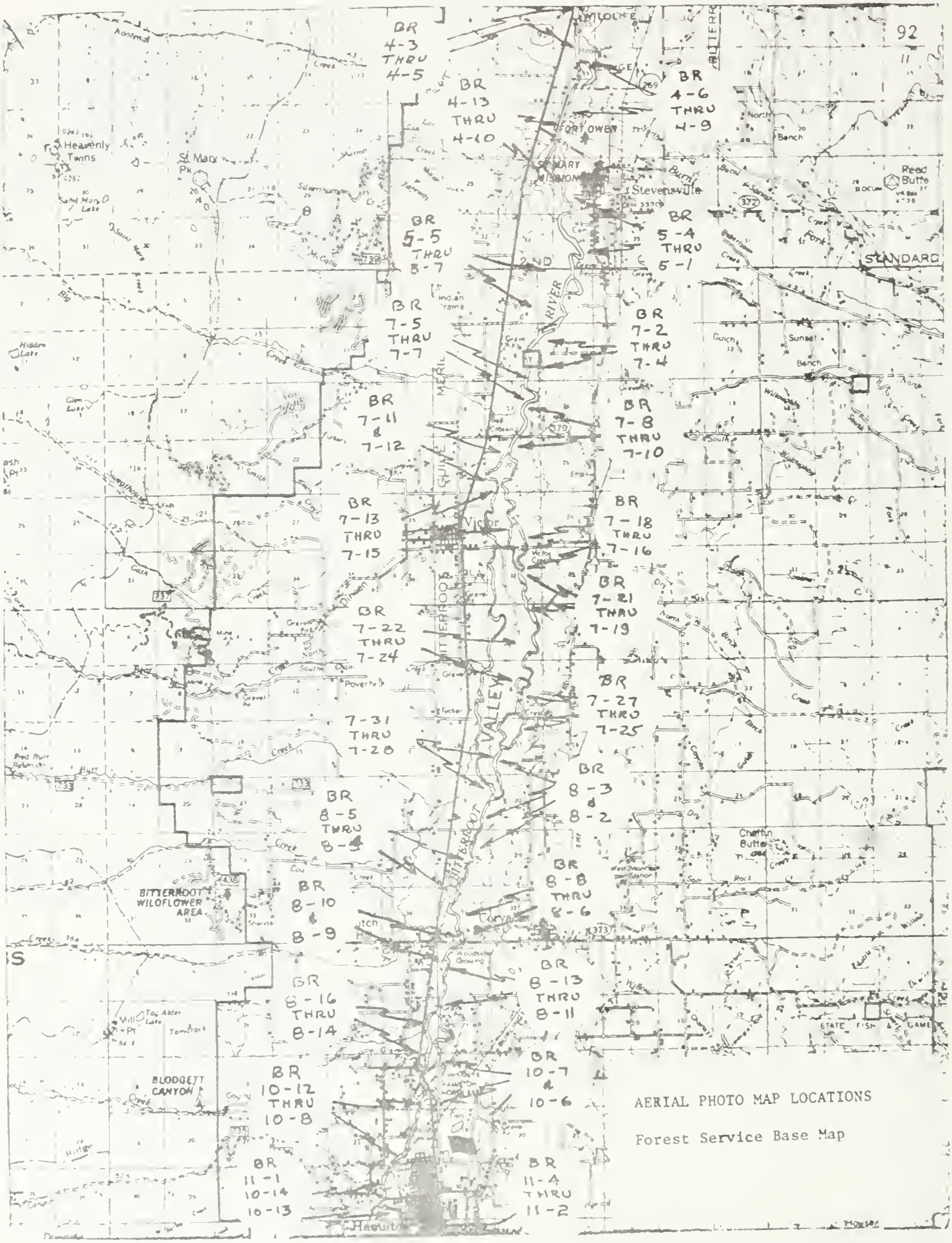
1.3 Annual Work Report

The Bitterroot Conservation District will annually prepare and submit to the Dept. of Natural Resources and Conservation and to the Dept. of Health and Environmental Sciences copies of the District's work report describing accomplishments, problems encountered, next year's goals, and funding needs as per the Supplement to the Memorandum of Understanding.



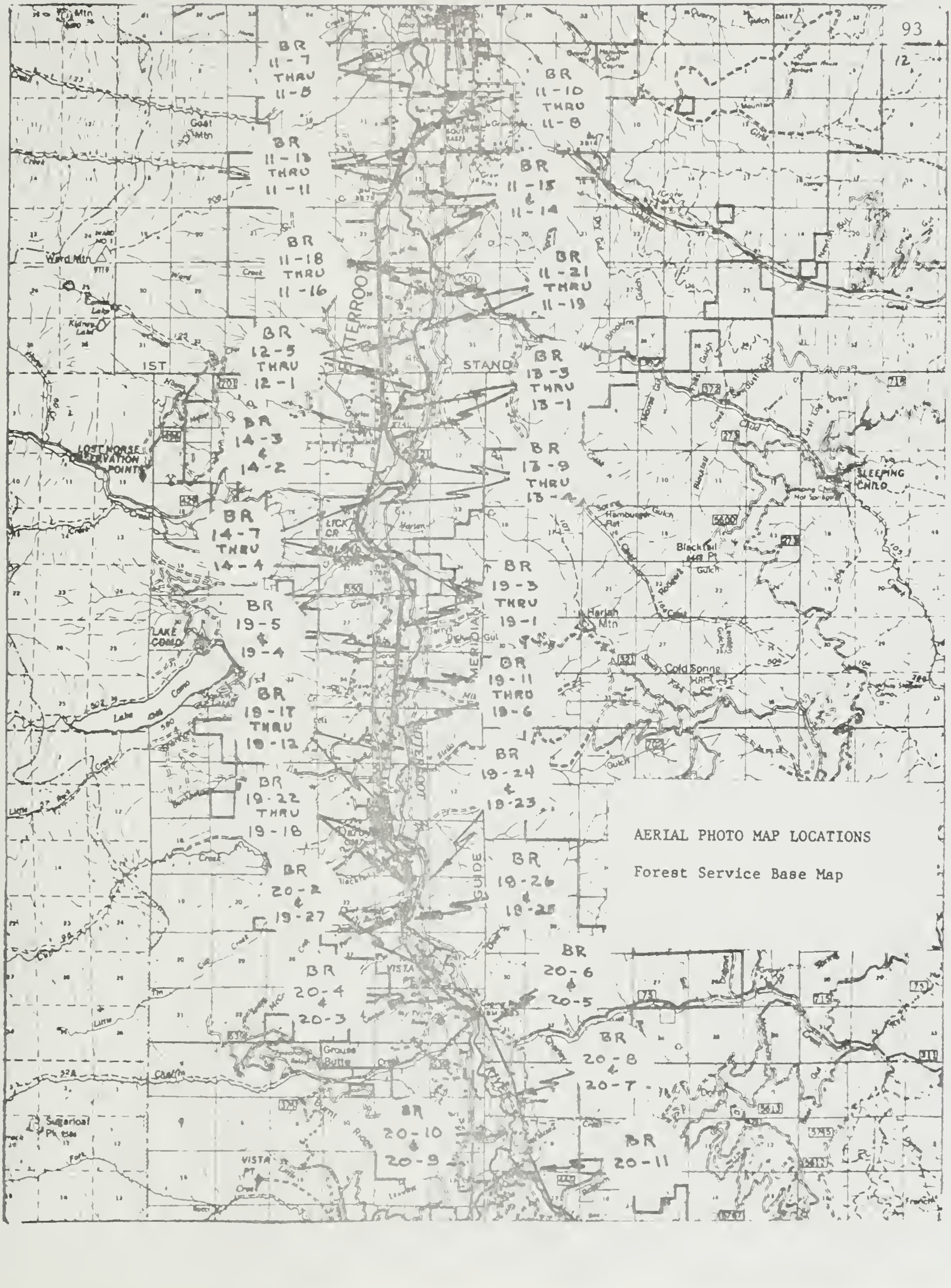
AERIAL PHOTO MAP LOCATIONS

Forest Service Base Map



AERIAL PHOTO MAP LOCATIONS

Forest Service Base Map



AERIAL PHOTO MAP LOCATIONS

Forest Service Base Map